



September 1997

Hit or

Cyan's struggle to make the sequel

Myst?

The inside story of RIVEN By Jon Carroll

The New Rules of the New Economy
by Kevin Kelly

What Has The NY Times Been Smoking?

Chip Hop: The Hood Meets Cyberspace

Cloning? What's the Big Deal?

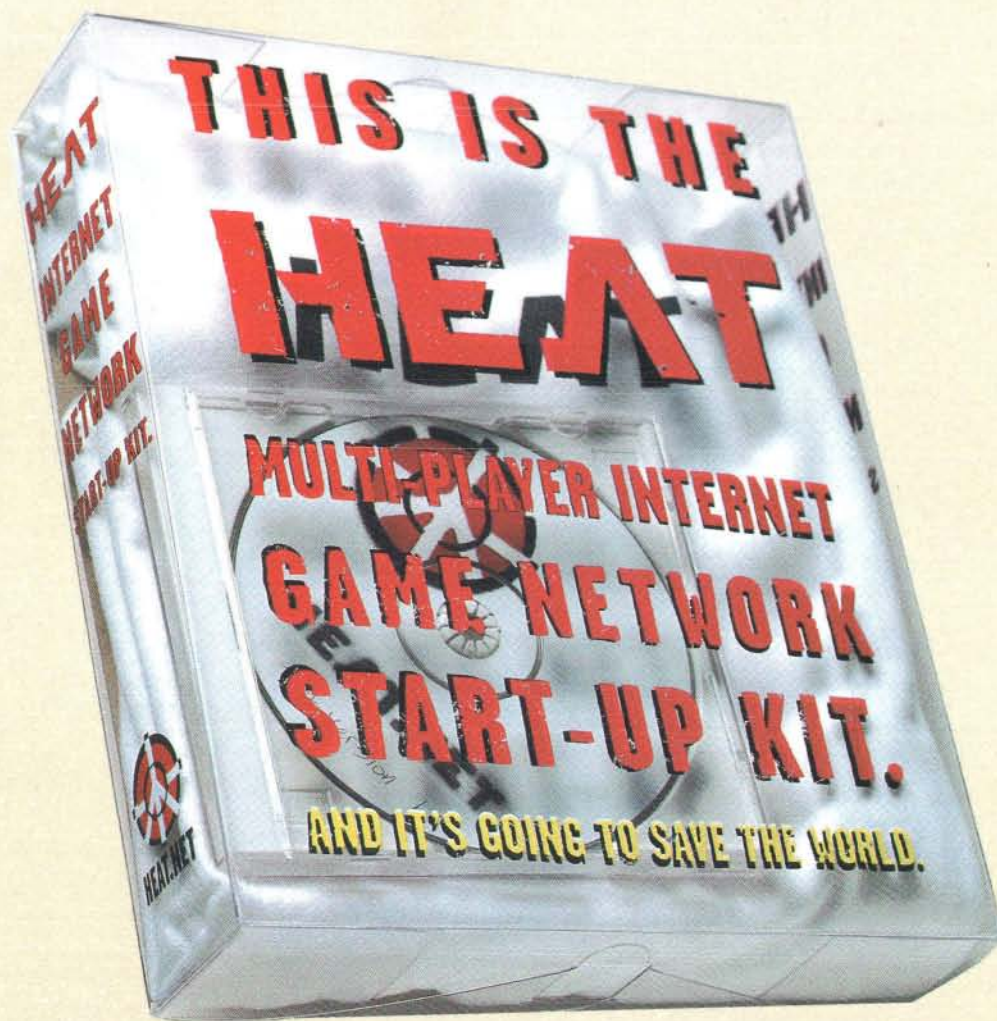


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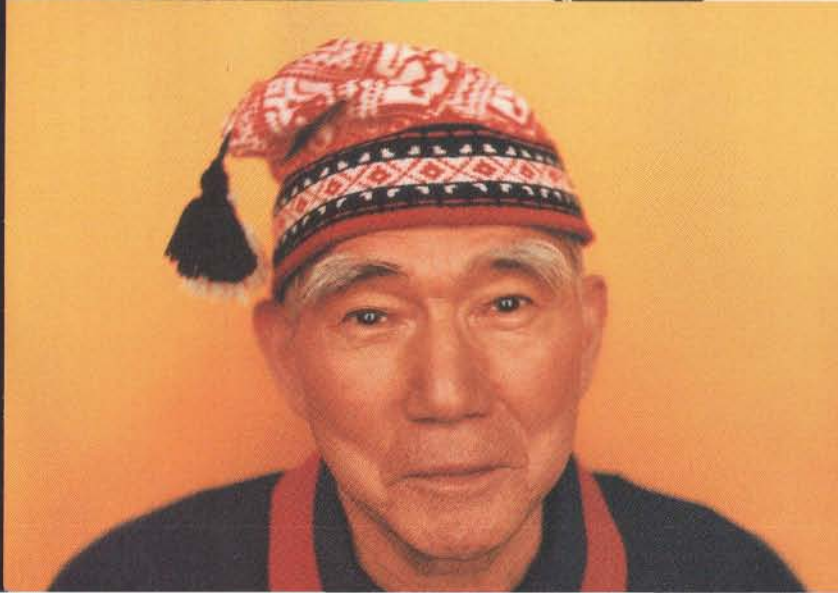
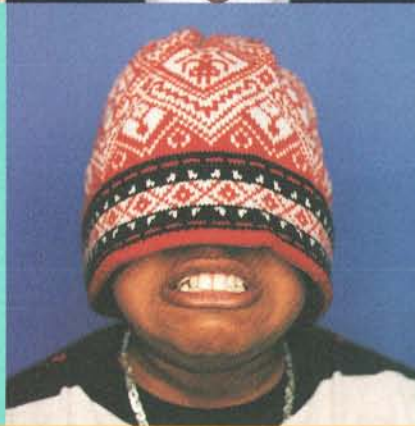
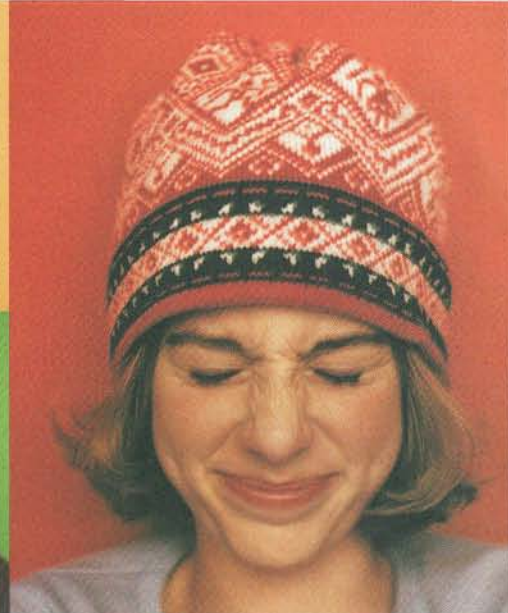
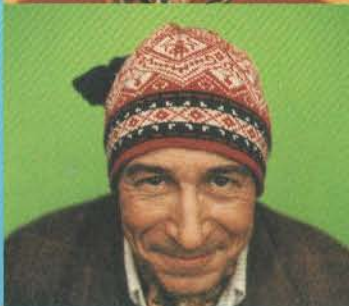


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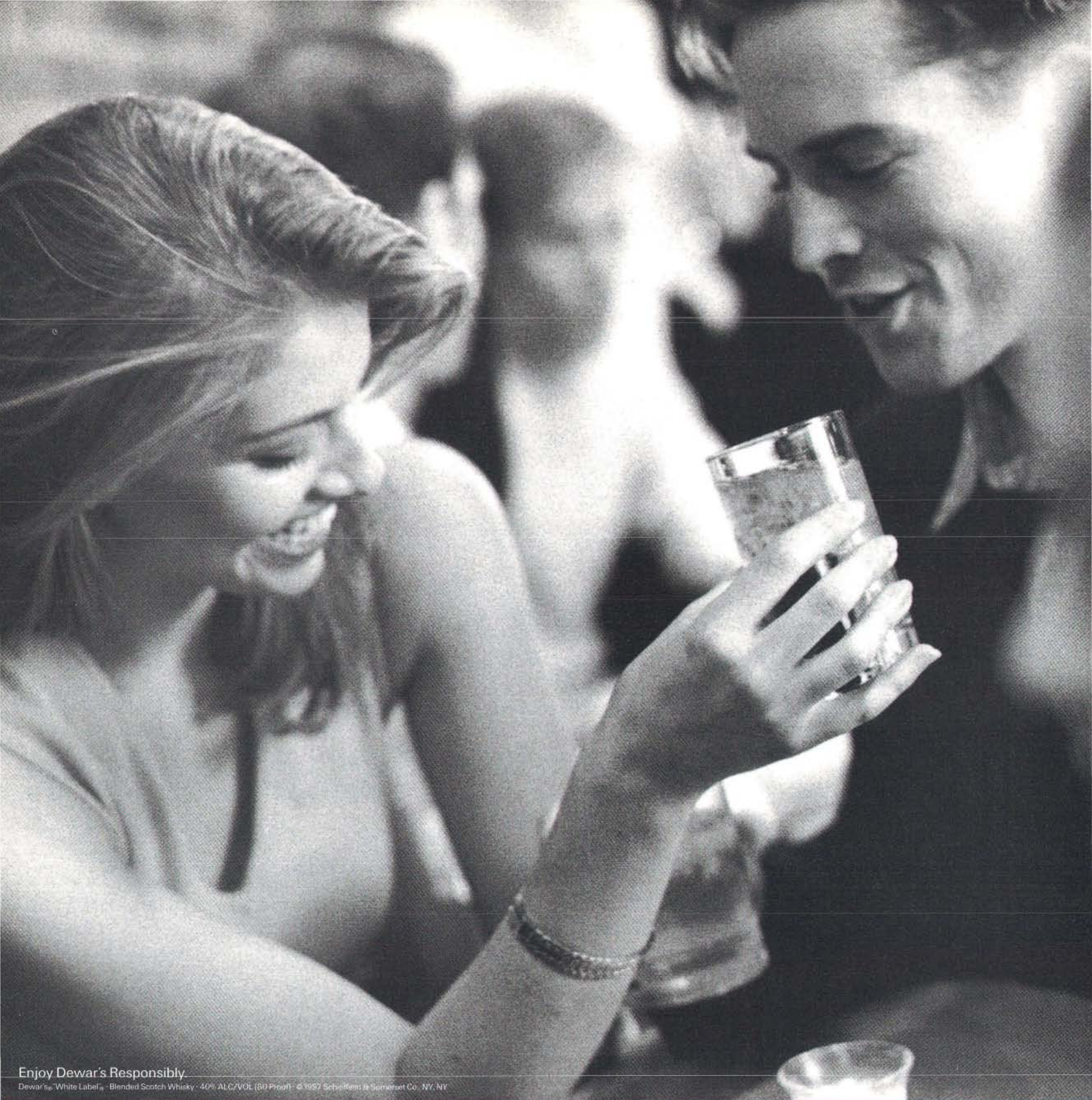
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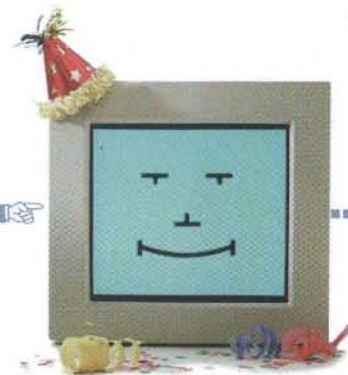
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1992

By making R/3 Year 2000-compliant, SAP solves the biggest problem facing the computing world years before it's a problem.



1996

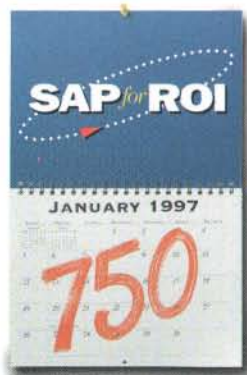
R/3 3.1 named "Technology of the Year" by *Industry Week* magazine.

1996

With the release of R/3 3.1 Internet, SAP changes the world of business. Again.

1996

SAP addresses the unique needs of emerging corporations with the introduction of the Certified Business Solutions (CBS) program.



1997

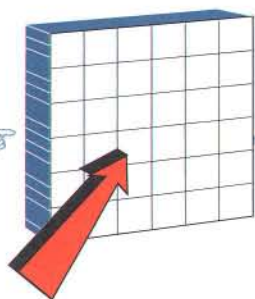
A record 750 customers go live in one month.

1997

25,000 Motorola employees go live with the R/3 HR and Payroll applications, establishing a foundation for managing employee information worldwide.

1997

Reebok adds SAP Retail to its manufacturing solution to create a truly streamlined, global supply chain.



1993

SAP gains momentum while the customer installation base grows to over 1,900.



1994

SAP makes headlines by implementing R/3 for *The Seattle Times* in 88 days.



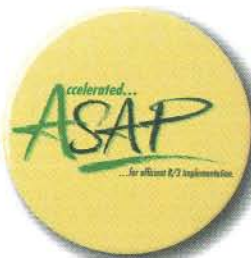
1995

SAP voted one of the Top 10 software vendors by *Software Magazine* 3 years in a row.



1996

SAP named the number one company of the *Manufacturing Systems Software* Top 50.



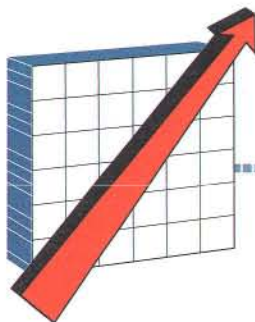
1996

AcceleratedSAP program introduced, making rapid implementation a reality.



1995

SAP opens the door for more companies worldwide to work their best with the release of R/3 industry solutions.



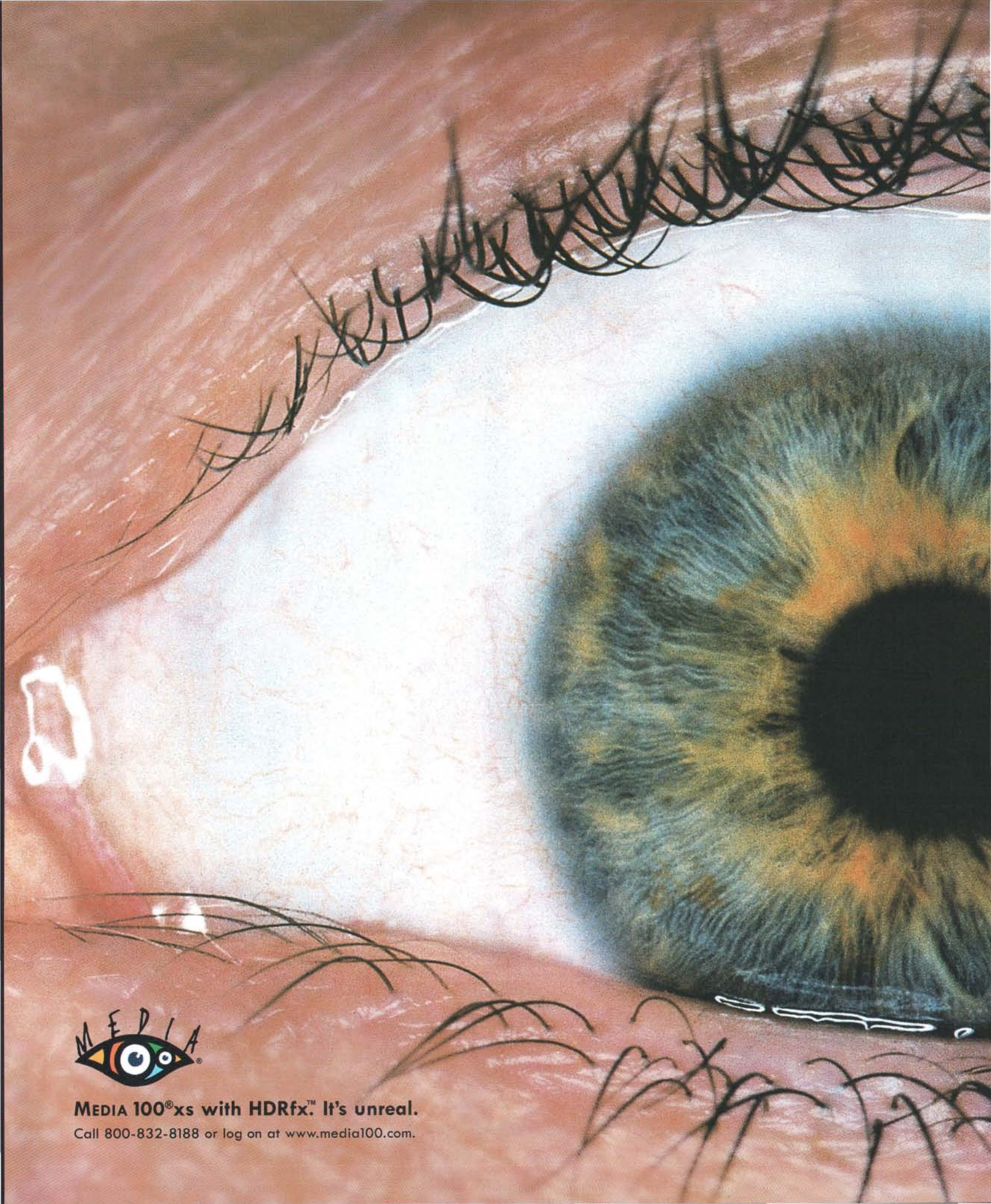
1997

Since the introduction of R/3, SAP's customer installation base has grown to over 10,000.



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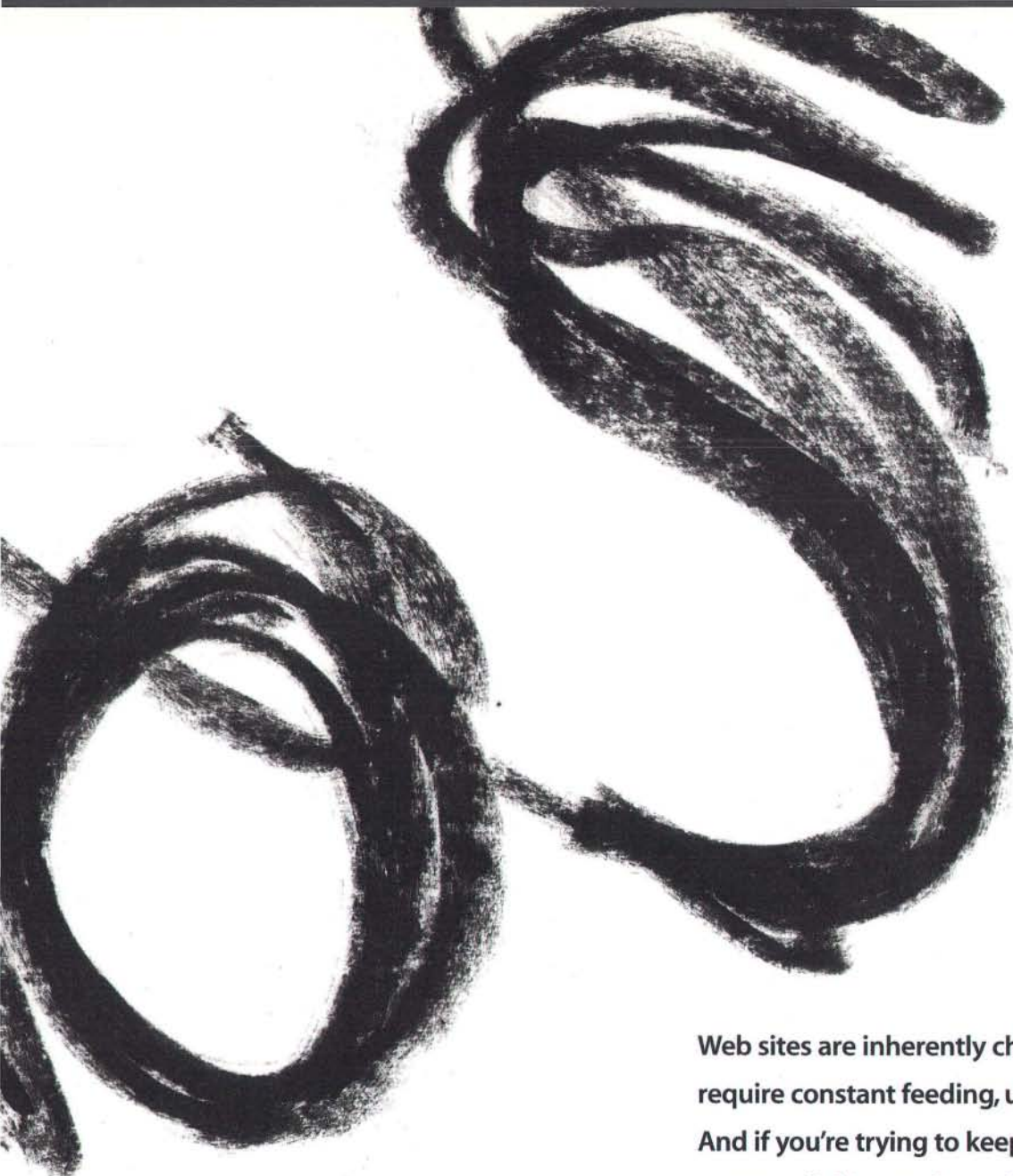


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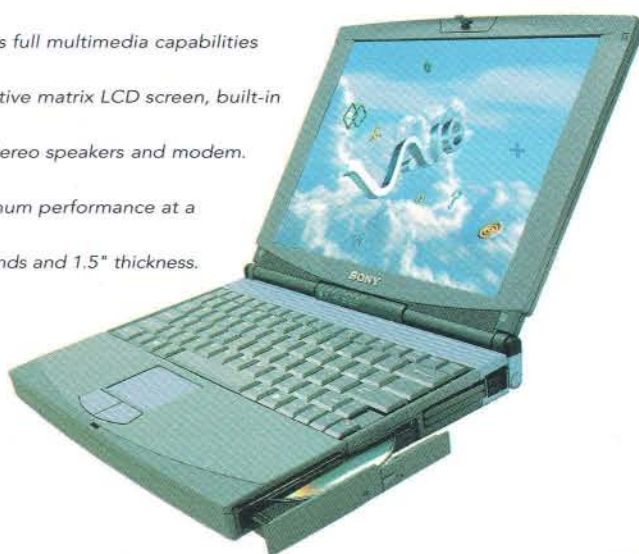
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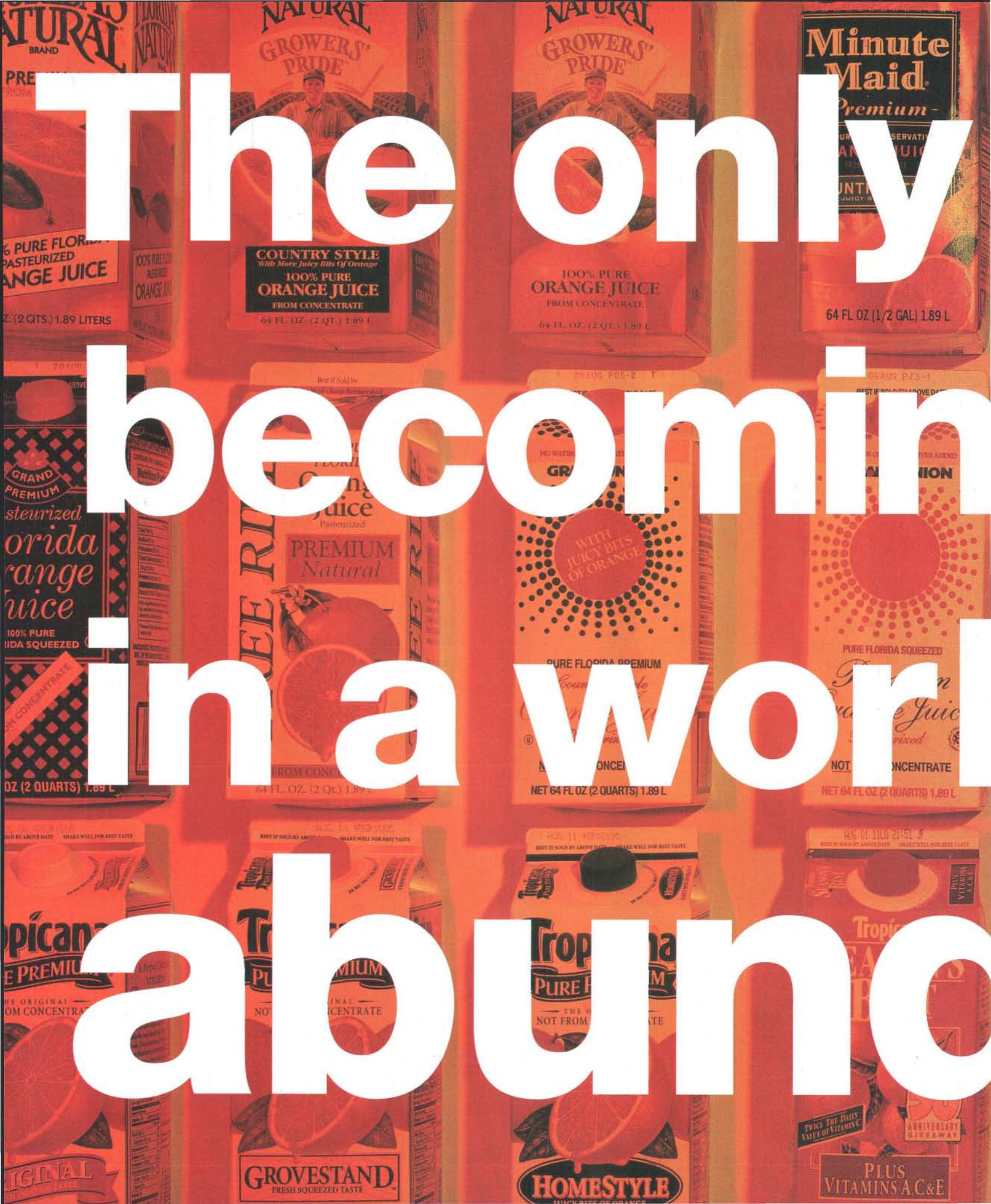
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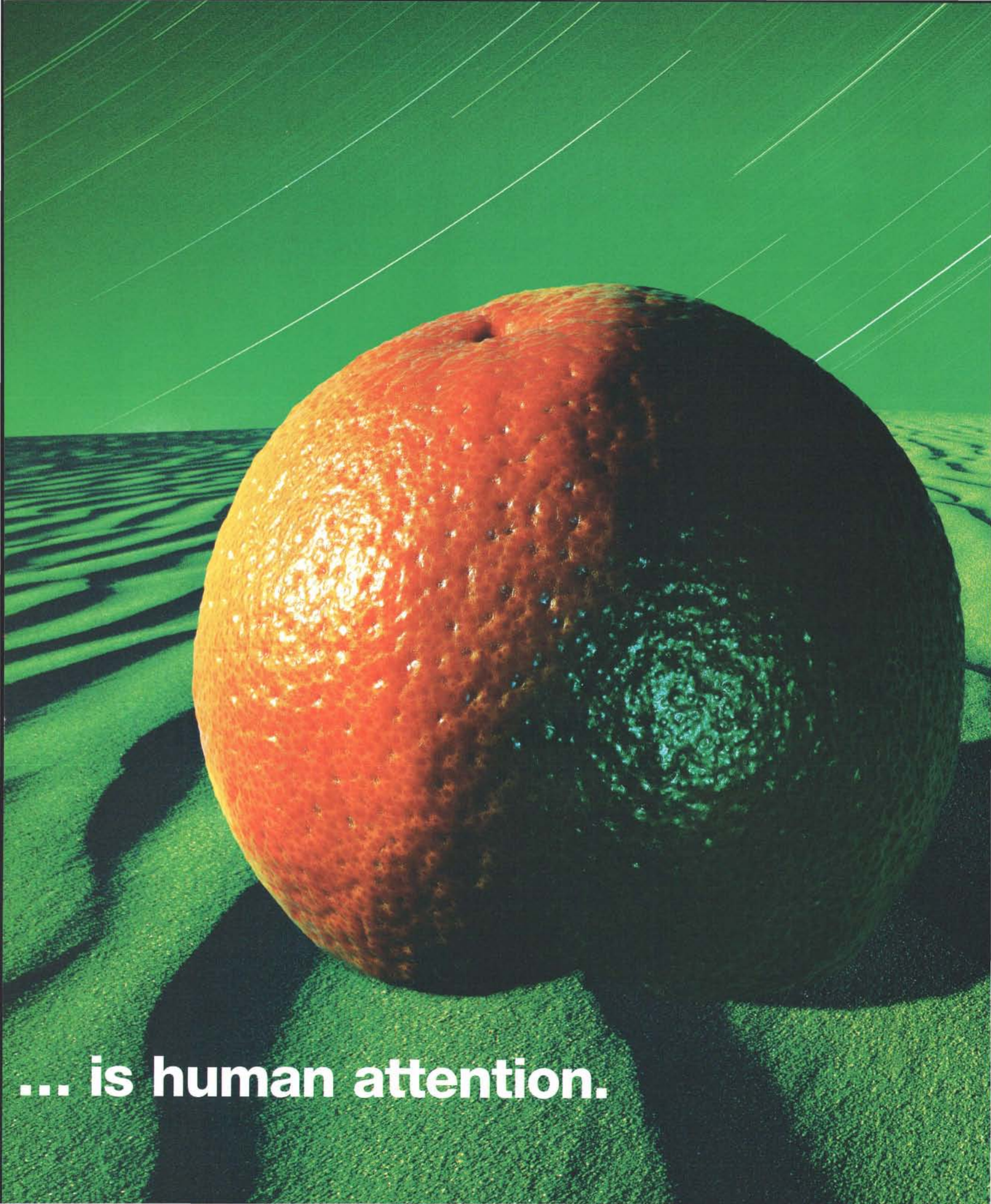
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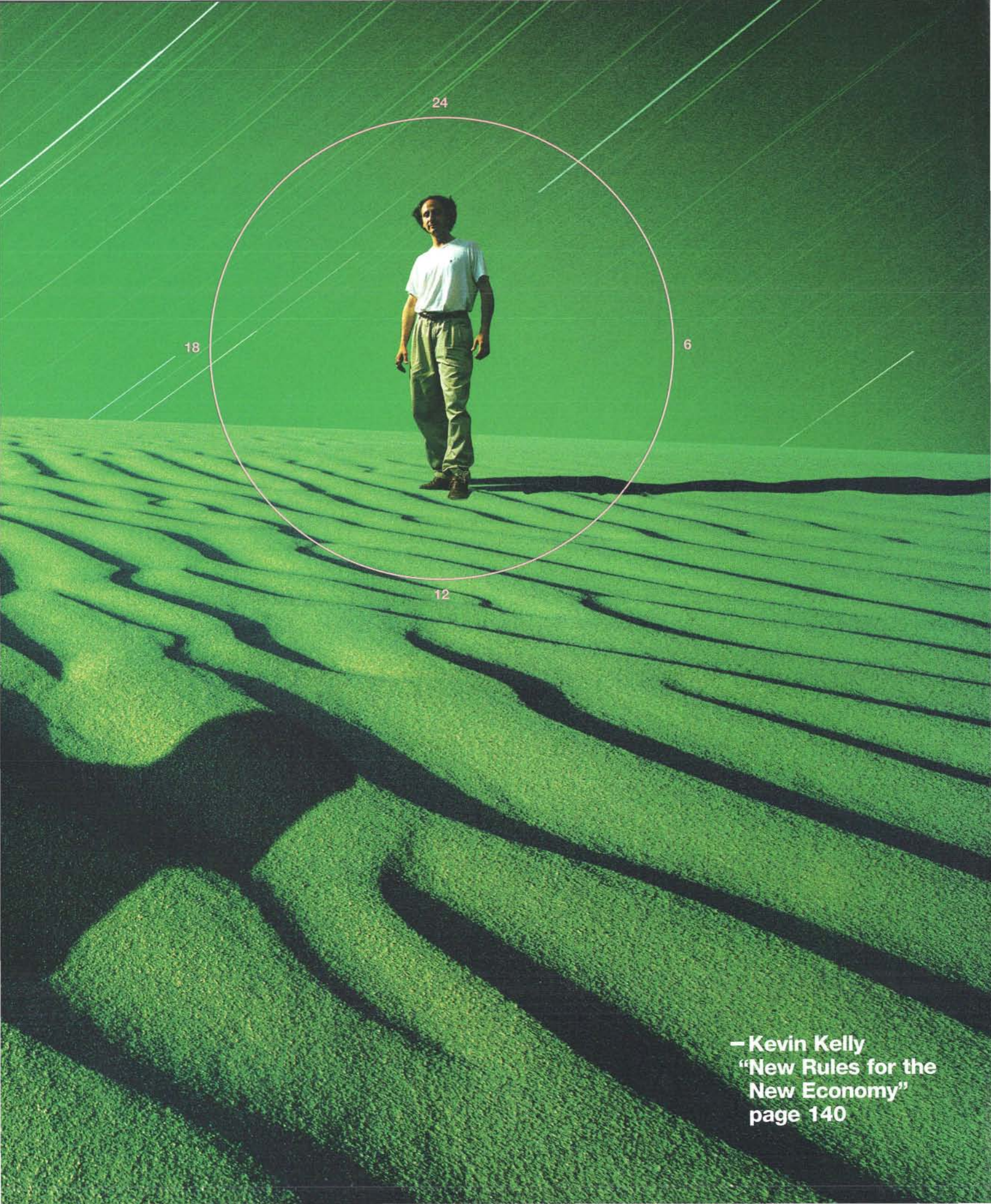
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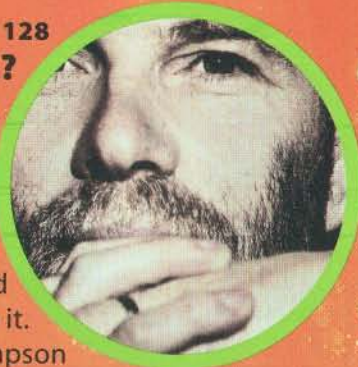
— Kevin Kelly
“New Rules for the
New Economy”
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Cloning. Problem? No problem.

Why all the hype and paranoia, asks biophysicist Gregory Stock. We're becoming the objects of our own technology, and we better get used to it.

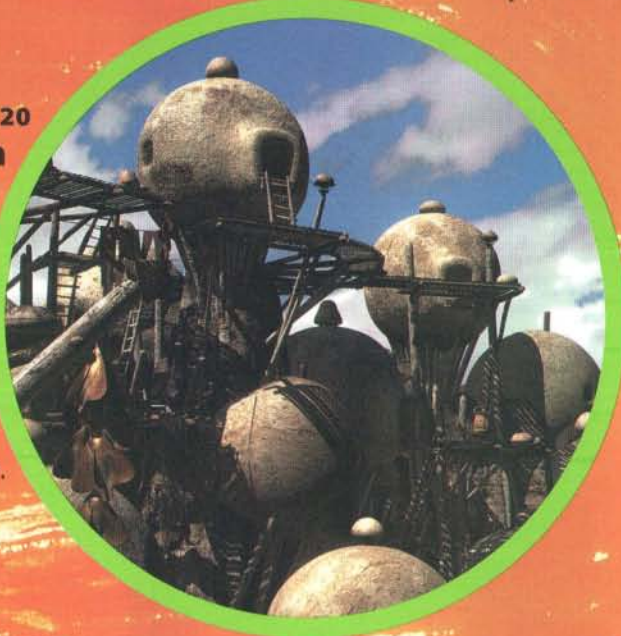
By Roderick Simpson



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(D)Riven

Myst was so beautiful, so compelling, so revolutionary, that its sequel created impossible expectations, especially among its obsessed creators. Jon Carroll on the exclusive inside story of making *Riven*.



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throughout this issue
to connect with the readers
and creators of *Wired*.



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The Netizen: What Have They Been Smoking?

Since *The New York Times* woke up to the Internet as a news story, the Gray Lady's been doing its damndest to blame cyberspace for the evils that roam the earth.



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Chip Hop

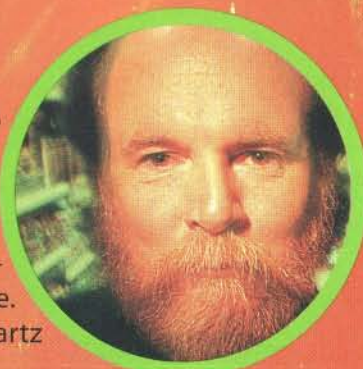
What happens when the hood meets cyberspace?
By Jesse Freund

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The Progressive Grocer

According to grocer-philosopher Ryan Mathews, online shopping will work not because it's convenient, but because it's intimate.

By Evan I. Schwartz

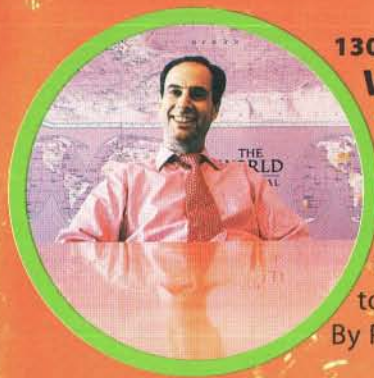


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Introduction: James Porto.

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Context 5.09



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Fairfield, Iowa, is home to some of the wily callback companies that are now turning themselves into virtual phone companies to battle the telco giants.

By Peter Maass

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Civil Rites

In *The Dove*, artist Romare Bearden captured the day-to-day of African-American life against the backdrop of the civil rights movement.

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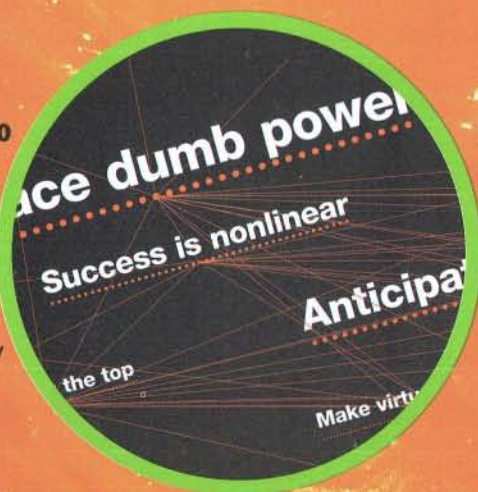


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New Rules for the New Economy

Twelve dependable principles for thriving in a turbulent world.

By Kevin Kelly

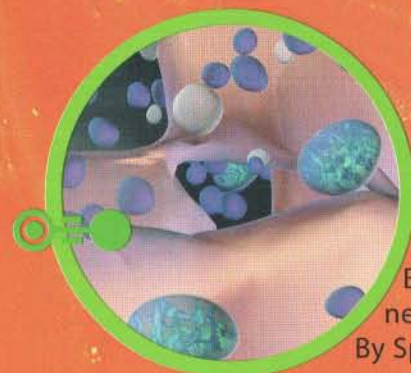


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Kenneth Eward's BioGrafx lays bare a new vein of visualization.

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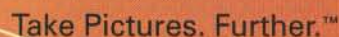


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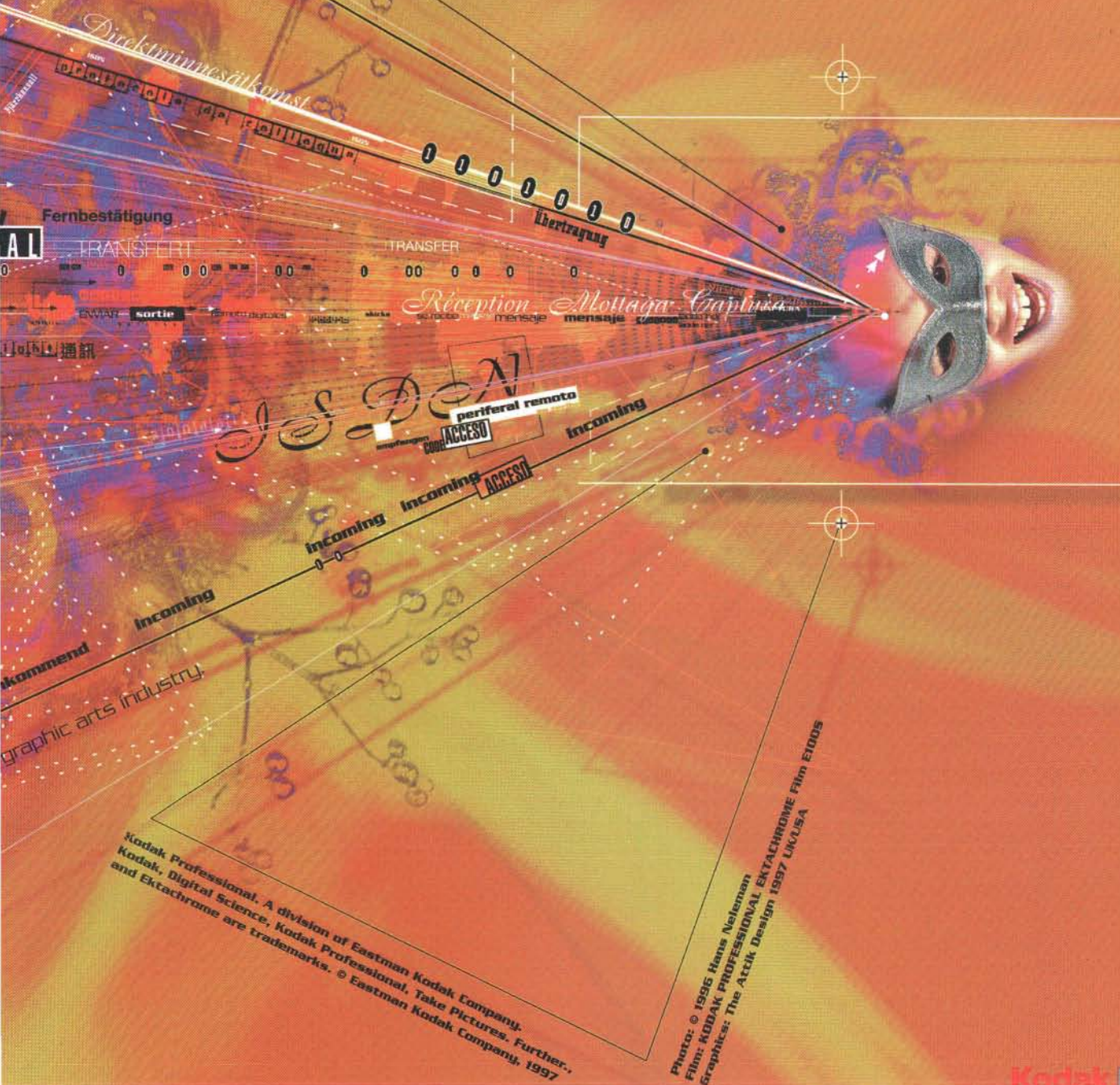
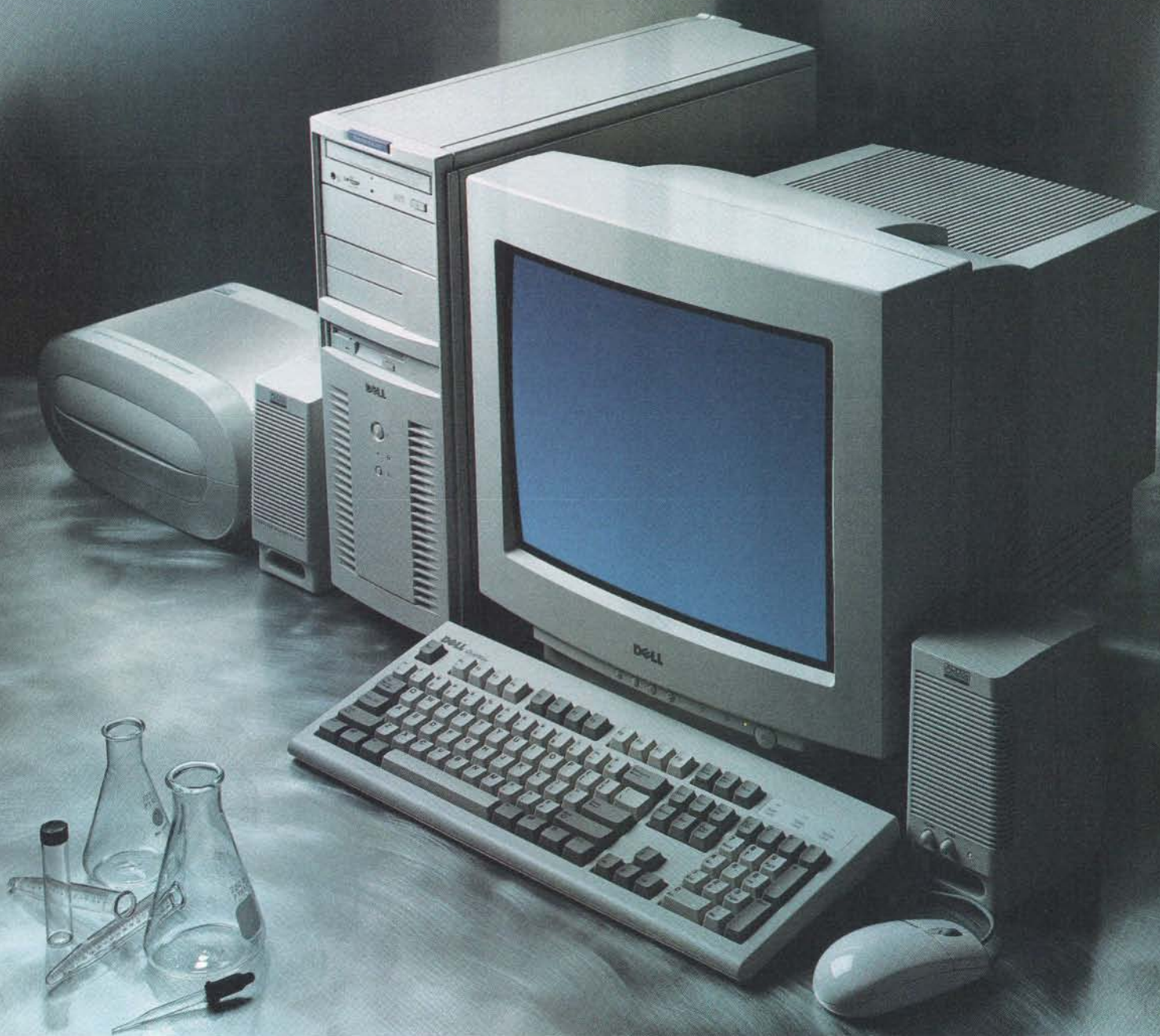


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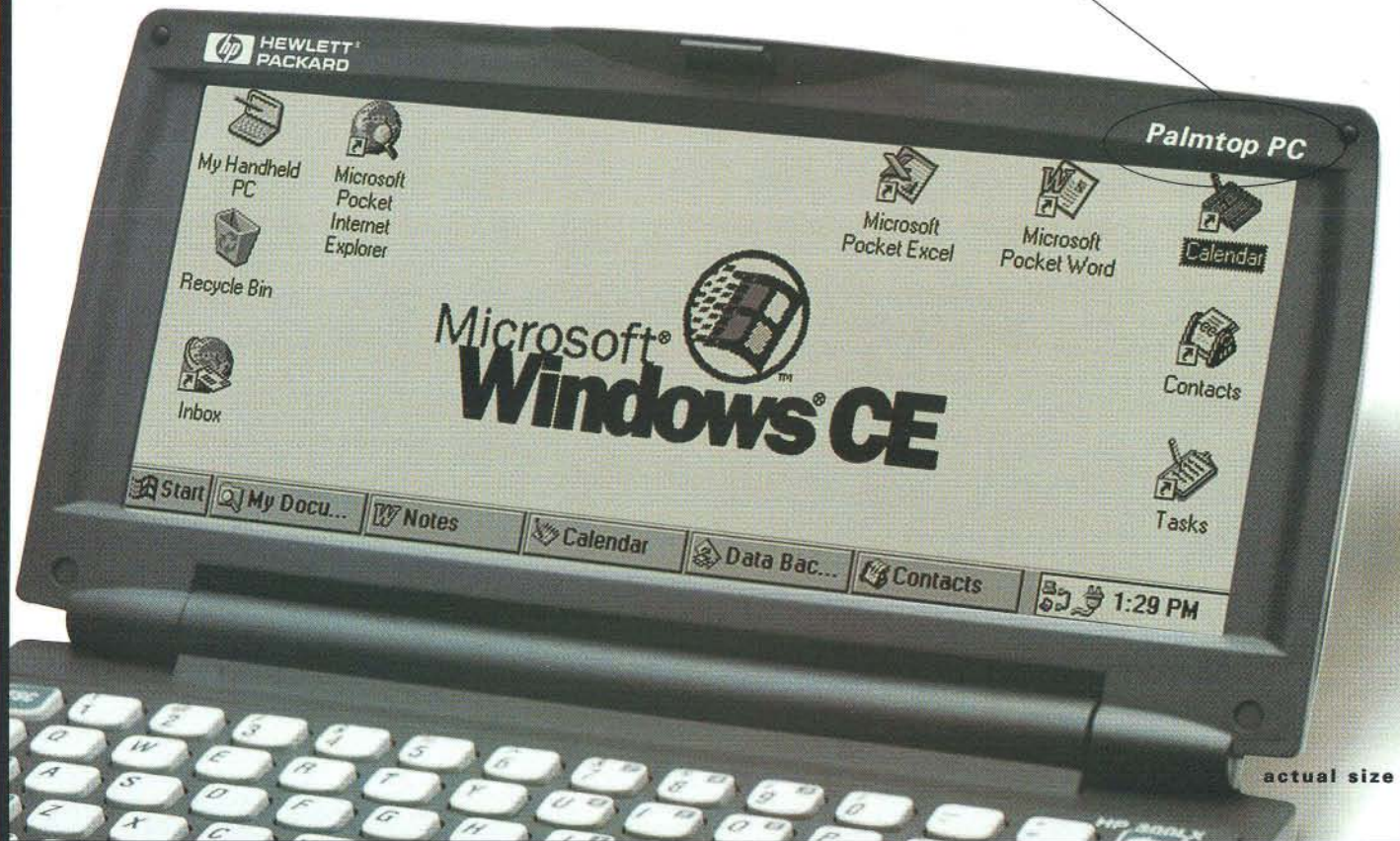
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Boom and Gloom

My God! I almost cried after reading "The Long Boom" (*Wired* 5.07, page 115). Finally someone has something positive to say about our future. Growing up in the 1970s and 1980s, I was bombarded with negative scenarios of the future, all of which ended with mushroom clouds. Thank you for being the purveyors of optimism! Excuse me now – I'm off to do my part to save the world.

Mariel Garza

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"Twenty-five years of prosperity, freedom, and a better environment"? I not only buy it, I think it's much too conservative. This boom is going to happen no matter what. National authorities will not be able to stop it.

Governments are going to find it increasingly difficult to collect income tax from wired business-people. Right now, I could have a Japanese client wire my retainer to a bank in the Bahamas or another tax-free country and pay taxes only on the amount I bring to the US. Nations are going to be competing against each other for e-business. Easy local incorporation, supersecret banking, and no income tax will be prime components of their product mix.

With one of the lowest tax loads in the industrialized world, the US will easily switch income taxes to poll, property, and sales taxes. Furthermore, the greed of governments for tax income and the facility with which the wired world will permit money laundering will probably end the US war on drugs. You'll be able to buy crack at the local liquor store. The dealer will be your friendly, but broke, government.

While it will be possible for governments to continue collecting income taxes from poor slobs stuck in the industrial economy, I suspect the patent unfairness of taxing the wage slave while the e-businessman escapes will make income taxes political death.

Page Schorer

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Though many of the scenarios in "The Long Boom" are quite possible – even probable – most of the article bordered on ultraoptimism and wishful thinking.

As long as there are people and resources ripe for exploitation, the good ol' captains of industry will find a way to exploit them for profit. One need look no further than the Third World for victims of corporate giants such as Nike and Pfizer Pharmaceuticals.

I'd like to be able to put faith in progress, but it seems technology is moving too damn fast for the social and political aspects to catch up. Now all of a sudden the turn of the century will bring a world where everyone eventually gets together? Somehow, I don't think so.

Brian Taylor

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property rights of the corporation? Do we own our genes? If someone else owns my genes, how is that different from saying they own me?

Lorne Beaton

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While I grant that some people are simply afraid of science, it is quite possible that those seeking the cloning ban do so out of a desire to have the issue submitted to scientific and public debate before the practice becomes widespread – with the idea that such debate will be for the greater good of society (and not to enhance the reproductive health of those seeking the ban).

Myhrvold claims that a ban on cloning is racist, as if there are no bans on the way we mix our genes to produce offspring. On the contrary, many such restrictions exist – both natural and those imposed by the state.

Currently it is not possible for two people of the same sex to mix their genes and produce offspring. In many states, laws prohibit immediate family members from bearing children together. Using Myhrvold's definition of racism, it could be claimed that we are all racist by nature in that we often

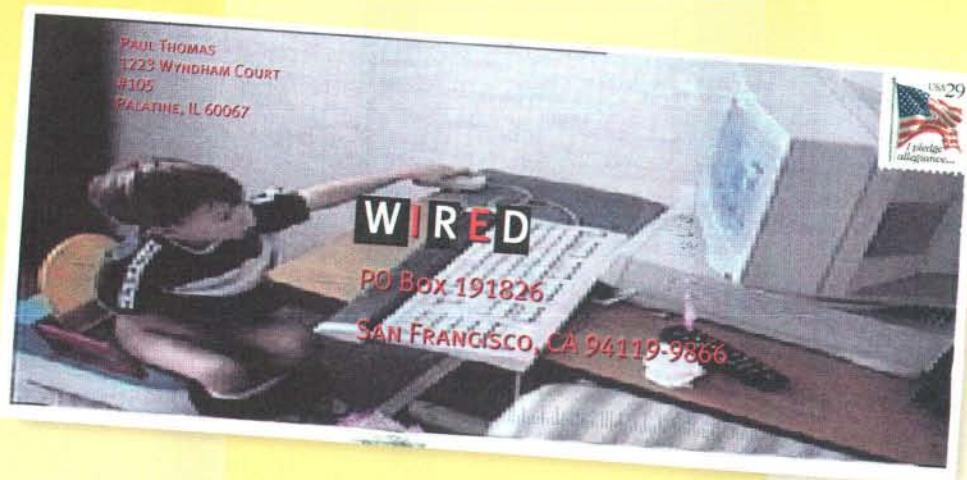
exclude the gene sets of many potential sexual partners before choosing a mate.

Eric Wells

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Especially Effected

Once again, *Wired* has shown its ability to separate reality from futuristic cyberguru hype ("F/Xtravaganzas," *Wired* 5.06, page 124). As a special effects model maker on *Titanic*, *Apollo 13*, *The Fifth Element*, and 23 other feature films, I found it encouraging to see you give credit to nondigital filmmaking crafts. Effects visionaries have been predicting the obsolescence of models and animatronic creatures ever since that crazy computer-generated water tentacle in *The Abyss*.



Cloning Around

Nathan Myhrvold thinks the "most upsetting" possibility in human cloning is that "rich people with big egos will clone themselves" ("In Vitro Veritas," *Wired* 5.06, page 109). The upsetting thing about human cloning is not the possibility that the Gateses and Trumps of the world might manufacture twins of themselves; it is the commodification of the human genotype.

Animals with desired genetic characteristics can already be patented. What happens when a biotech lab decides to do the same, not just to a single gene but to an entire human genotype, to be cloned and sold for any desired purpose? Whose rights will prevail – the human rights of the cloned individual, or the



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If anything, computer graphics have created more work for physical effects artists by renewing the public's interest in special effects. Digital companies are hobbled by a shortage of skilled computer artists and six-figure price tags for workstations. Most traditional effects people supply their own tools and work freelance, so a model shop is still relatively quick and cheap to set up.

Computers have enabled unprecedented realism in effects like explosions, molten lava, smoke, fire, and water (no more giant droplets, like in *The Poseidon Adventure*). But when digital artists try to make vehicles, buildings, landscapes, or creatures, they end up with what looks like an extremely expensive, shiny cartoon.

Maybe someday faster and cheaper computers will make model ships and rubber monsters unnecessary, but by then we won't need actors, either. We'll just pay a licensing fee for the Sly or Arnold software.

George Willis
Venice, California

Apple's Elixir

Instead of giving US\$10 million to Scott Adams ("101 Ways to Save Apple," *Wired* 5.06, page 114), give it to George Lucas. Position Apple's comeback as a classic battle between Good and Evil. Imagine a commercial that shows a consumer contemplating his purchase. We see him looking at a Mac and a Wintel machine sitting side by side. As he steps toward the Wintel box, we hear Sir Alec Guinness telling him to "trust his feelings." The Wintel box is shown with the voice-over "give in to the dark side" just as Win95 glitches and a C-prompt appears with Darth Vader breathing. Eventually we see the man making the right decision as we hear, "No, I will never give in to the dark side."

Sam Guseman
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In discussing Apple's failure to bring the Copland operating system to market, Microsoft's Nathan Myhrvold says Apple had to suffer "the ultimate ignominy" of buying an operating system from the outside. This is a very ironic statement, considering that Bill Gates and Paul Allen bought a CP/M clone called 86-DOS and made some modifications. It was later known as MS-DOS.

Michael D. Meloan
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I sure hope Apple read the article! Apple needs just one important solution: Listen to your customers — they know what's good for you. I cringe every time Gil Amelio makes a decision and Steve Jobs just sits there. I'm thinking of starting a company to challenge Apple, to compete directly with it. Maybe that would light the much-needed fire under its corporate ass. What we Apple fans need is not the same

old Apple, but something innovative and cool. And Apple, hear this: We would drop you in a second!

Why doesn't *Wired* start a computer company based on its suggestions? All of these things are pretty obvious — isn't anyone listening? How about financing me to run a company to your specs?

Oh, and Apple? You can damn well bet Microsoft read that article.

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Big Words

"Glossofacilia: A tendency to use very large words to explain very small phenomena. Glossofacilia drives to complexify rather than simplify and is the natural instinct of reactionaries to an age of change" ("Speak the Future," *Wired* 5.06, page 100).

Complexify? It's *complicate*, bonehead. And does the word *reactionaries* set off anyone else's agenda detector?

Robert Forsman
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Wait Gain

I just read "Digital Obesity" (*Wired* 5.07, page 188). I experienced indignities similar to Negroponte's when I bought a PowerCenter 150 for my wife in January. The installation became a full-time job for almost two months. Every CD-ROM contained hundreds of megabytes of data to sort through, test, configure, reconfigure, retest, et cetera. Her machine is starting out with over 4,000 files. I hit half a dozen serious snags.

My wife couldn't believe it took me as long as it did. Neither could I. What makes it worse is that this was a Mac and I had been employed as a LAN manager from '87 to '91 — I installed software for a living.

I have no idea how less-experienced people are dealing with this. I can only assume that many installations are quite fragile.

Brian Dana Akers
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Much to the derision of friends, I am still clunking along at 66 MHz with a 486 chip and Windows 3.1. My reasons are simple: with 24 Mbytes of RAM and four years of careful operation, my machine is fast, familiar, and reliable (rather like my 1986 Chevy Suburban).

This reactionary stance is starting to get me into trouble, though. The installation of a new 36Kbps modem required trying three different products and US\$150 in labor charges before I could find one that would work with my antiquated system! However, my biggest frustration, as Negroponte so clearly illustrated, is with software. My Excel 6.0 does nothing I need above my Excel 3.0. But to maintain compatibility with the files I send to and receive from other users, I have to run bigger, slower applications. The "need for compatibility" keeps users upgrading

perfectly satisfactory products. The X.X upgrade is really a triumph of marketing over real-world needs.

This situation shares a number of parallels with the American automobile industry in the 1950s and early '60s. Desperate to keep the consumer returning to the showroom annually, manufacturers relied on unneeded styling and engineering updates, sort of a Cadillac Eldorado 6.5! We need a Volkswagen Beetle OS to free us from this weight and horsepower loop.

Philip Barrett
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Telco Terrorism

Declan McCullagh presents a hopelessly biased point of view while taking some cheap shots at Bell Atlantic, Nynex, and the rest of the telephone industry ("Telco Terrorism," *Wired* 5.06, page 53).

Most Americans agree that telephone customers should pay for the services they use. Businesses generating higher call volumes generally pay higher prices than those who generate less. McCullagh fails to point out that ISPs stuffing our residential and business networks with billions of bits and bytes a day don't want to help upgrade the system to accommodate that explosion in online traffic.

ISPs can well afford to pay a flat, cost-based charge that allows us to do the necessary upgrades needed to handle the massive traffic volumes. Our proposal offered earlier this year would allow consumers to continue to enjoy flat-rate pricing packages. There is absolutely no reason why this cost could not be absorbed by the burgeoning Internet industry. We have never proposed that new charges be levied on residential customers.

In its recent order on access-charge reform, the FCC imposed additional fees on second residential lines to subsidize primarily ISP-driven demand for network capacity. In the end, customers who don't go online could be forced to pay for services they don't use.

We want Internet traffic on our networks; we also want ISPs to pay a fair price. The truth is that Internet traffic is causing congestion problems in our networks and ISPs are using our networks for far less than it costs us to service them. We are developing and deploying both short- and long-term technical solutions, but the regulatory obstacles to determining a fair access price for Internet providers need to be eliminated.

Edward D. Young III
Vice president and associate general counsel
Bell Atlantic
Philadelphia

It's extremely frustrating to hear the telcos whine about Net surfing overburdening their networks. There was a time when the telcos charged lower per-minute rates for evening and night service, to lure

callers when the lines were most idle. The more usage during off hours, the more they could drive their network costs down.

Now the telcos are seeing increased usage with the Internet, and they're still complaining. I believe they're having a problem accepting this major communication phenomenon because they didn't pioneer it, as they have other telecommunications breakthroughs. Now they want to charge an extra something per minute because they need to subsidize future network development. Well, they should have thought about that before computers met up with telecommunications.

I'm waiting for someone – perhaps one of the companies spotlighted in "The Race for Space" (*Wired* 5.06, page 42), like ICO Global or Odyssey – to come along and provide alternative access on a wireless basis. That would free up the local loop and allow the telcos to spend time developing a network worthy of our data requirements.

Mike Mueller

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Excellent article! While the Internet Access Coalition's position prevailed regarding access charges on ISPs, Internet consumers and small businesses will be the losers – no "special" access charges, just increased rates for second residential lines and business lines. So the Baby Bells will have even more revenue and still no incentives to build data-friendly networks.

Jan Goebel

Communications director

Information Technology Industry Council

Washington, DC

Femme Zone

While "In the Zone" (*Wired* 5.06, page 130) accurately portrays part of Starwave culture, there's much more to us than technojoys. There are more than the "couple of women" you mentioned. The producer of ESPN SportsZone is a woman. On the site I work on, ABCNEWS.com, we have more women than men on our staff of engineers, producers, editors, and designers. None of us play ultimate with the guys, but we do hike, jam in local bands, take photography classes, and go salsa dancing.

Your reporter should have explored further than the men's locker room, though admittedly none of the women would have been too keen on being photographed in our locker room with nothing but towels around our waists.

Reena Kawal

Associate producer, ABCNEWS.com

Seattle

Relocation

The note in Just Outta Beta ("Singapore Sling," *Wired* 5.07, page 157) on Singapore's new national intranet

was interesting. Too bad the "cred" of the report was diminished by the writer relocating Singapore's capital to Malaysia. Singapore is the capital of Singapore, whereas Kuala Lumpur is the capital of Malaysia.

The error is ironic, given that the Malaysian government has pledged a policy of no Internet censorship as part of a Bill of Guarantees to promote development of its Multimedia Super Corridor.

Mike McGurrian

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Technobabble

While reading "A Farewell to Arms" (*Wired* 5.05, page 51), I kept waiting to find out more about the dire threat we all face from digital rebels striking blows against the Empire. In the end, I felt I was watching a bunch of paranoid, technobabbling Chicken Littles clucking about an impending I-war that cannot be defined, located, or even confirmed. Sure, the rebels in Chiapas have a Web page. So what? So does a friend's daughter who loves Marilyn Manson. That doesn't make her a threat to national security.

In the future, worldwide information networks are far more likely to be used to control information and dissent than to foment revolution. Of course, that would mean the Internet is just another power tool/advertising rag in the great annals of politics and commerce.

Erik Milstone

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Star Power

Dave Winer poses the question, "When will Silicon Valley get the message that great software is created by people, not companies?" ("The Shame of Java," *Wired* 5.07, page 109). Not while software programmers are denied the persona of stars and don't have agents to represent them.

The business model for the software industry needs to become more like the movie model. Instead of the hire-and-fire protocol of traditional business, creative groups should be formed by combining the talents of independent individuals represented by agents who negotiate in their client's interests.

As long as programmers allow big business to treat them as chattel, they will get only the chaff from the massive harvest that only they can create.

Brooke W. Boering

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Contrarian Libertarian

Carl Malamud wants to preserve the rights of free speech and of access to government documents ("Contrarian Libertarian," *Wired* 5.07, page 130). This hardly makes him a libertarian.

Government's role on the Internet should be the same as that in real life: protecting people from assaults and thefts by others. Whatever commerce

is agreed to by consenting adults needs no government intervention, in real life or on the Internet.

Carl's other suggestions for government intervention – getting involved if ISPs provide bad service, Net-oriented R&D – are inappropriate for government, at least from the libertarian point of view.

Many think it is possible to have government intervention and civil liberties, too. Such a compromise is always a pact with the devil; true civil liberties come from minimal government, not big government with nice rules.

John L. Shelton

jlshelton@mindspring.com

He Is Wired

At the risk of sounding like a dead-language geek, I must take exception to the Latin translation of "Get wired!" on the cover of your June issue. Hey, I spent six years studying this stuff, and I rarely get a chance to use it, so I just couldn't let this opportunity go by.

Unless you intended to toady up to your readers (apparently individually, due to the singular number) by assuring them that they are already among the enlightened few, your translation is wrong.

Internexus es means (assuming we allow the invention of the word *internexus*) "You are wired!" I checked the Tired/Wired roster and did not see your readers listed under the appropriate column, so I can only assume it is a mistake. If you want to say "Get wired!" you would have to use the imperative voice, *Internexi estote*, which is plural (*Internexus esto* would be singular).

I can only hope we have red-flagged this tragic mistake before thousands of screensavers need to be changed.

Eric Stoltz

stoltz@primenet.com

Undo

Ear Plugs: We misidentified a Seagate 251 as a C8 251 ("Afterlife," *Wired* 5.07, page 146). ■ CD-WRONG:

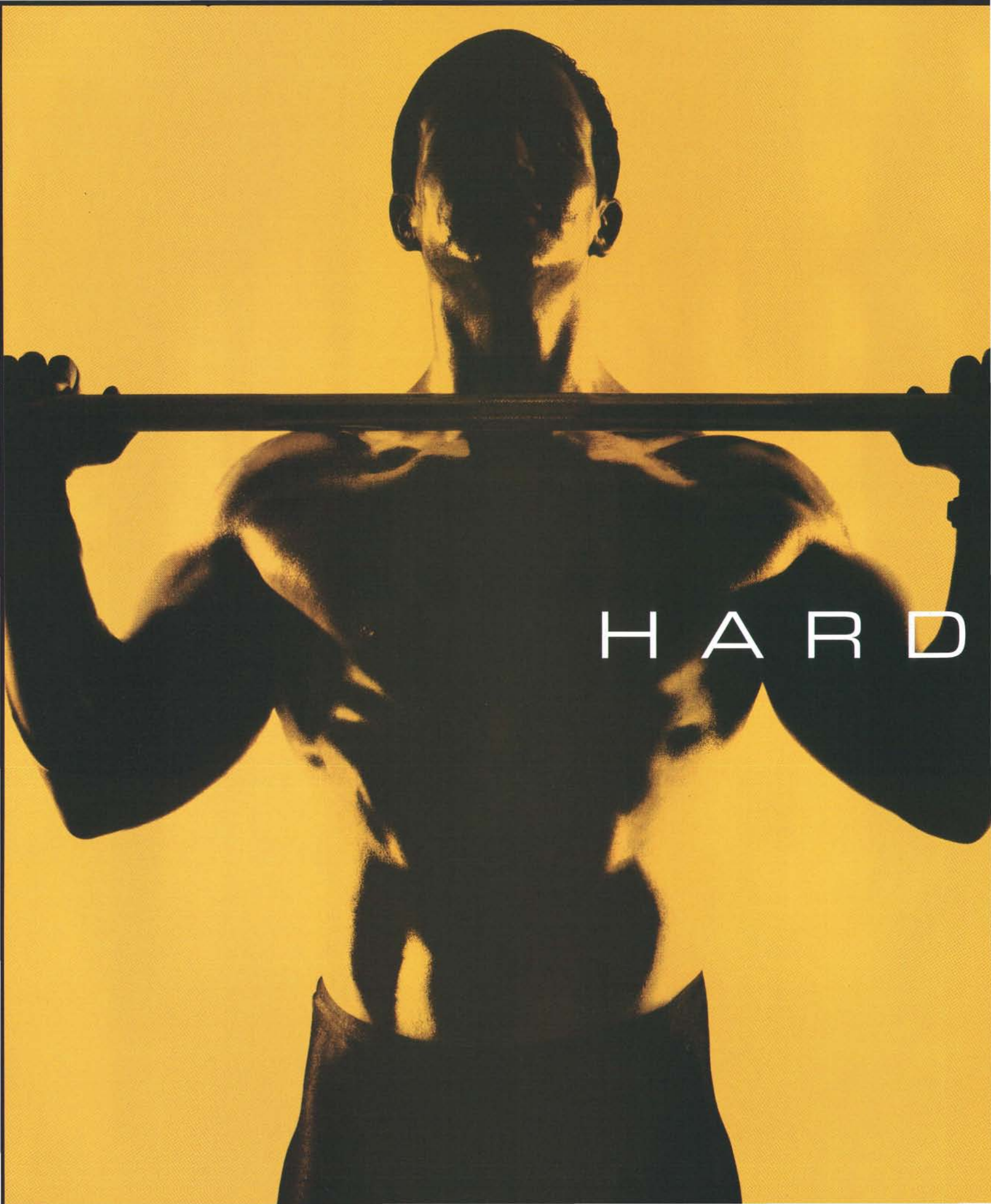
"Bosnia: Uncertain Paths to Peace" was not a CD-ROM project (Electric Word, *Wired* 5.06, page 42), but a presentation of *The New York Times* (www.nytimes.com/bosnia/). ■ White Out: White Town's single "Your Woman" ("Bedroom to Big Time," *Wired* 5.06, page 136) was released on the US independent music label Parasol Records prior to being released on EMI in the United Kingdom. ■ Belated Thanks: Vipin Gupta at Sandia National Laboratories provided analysis for the satellite images of North Korea ("Private Spy," *Wired* 5.08, page 114).

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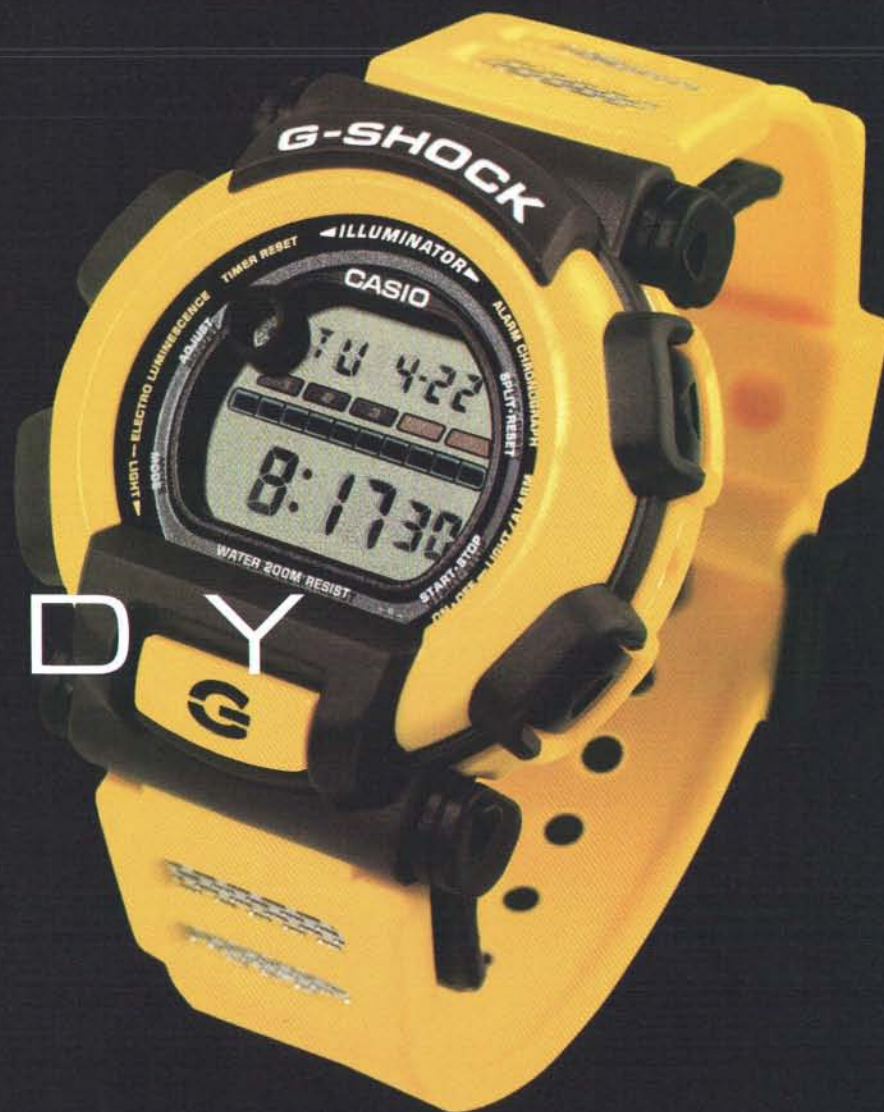
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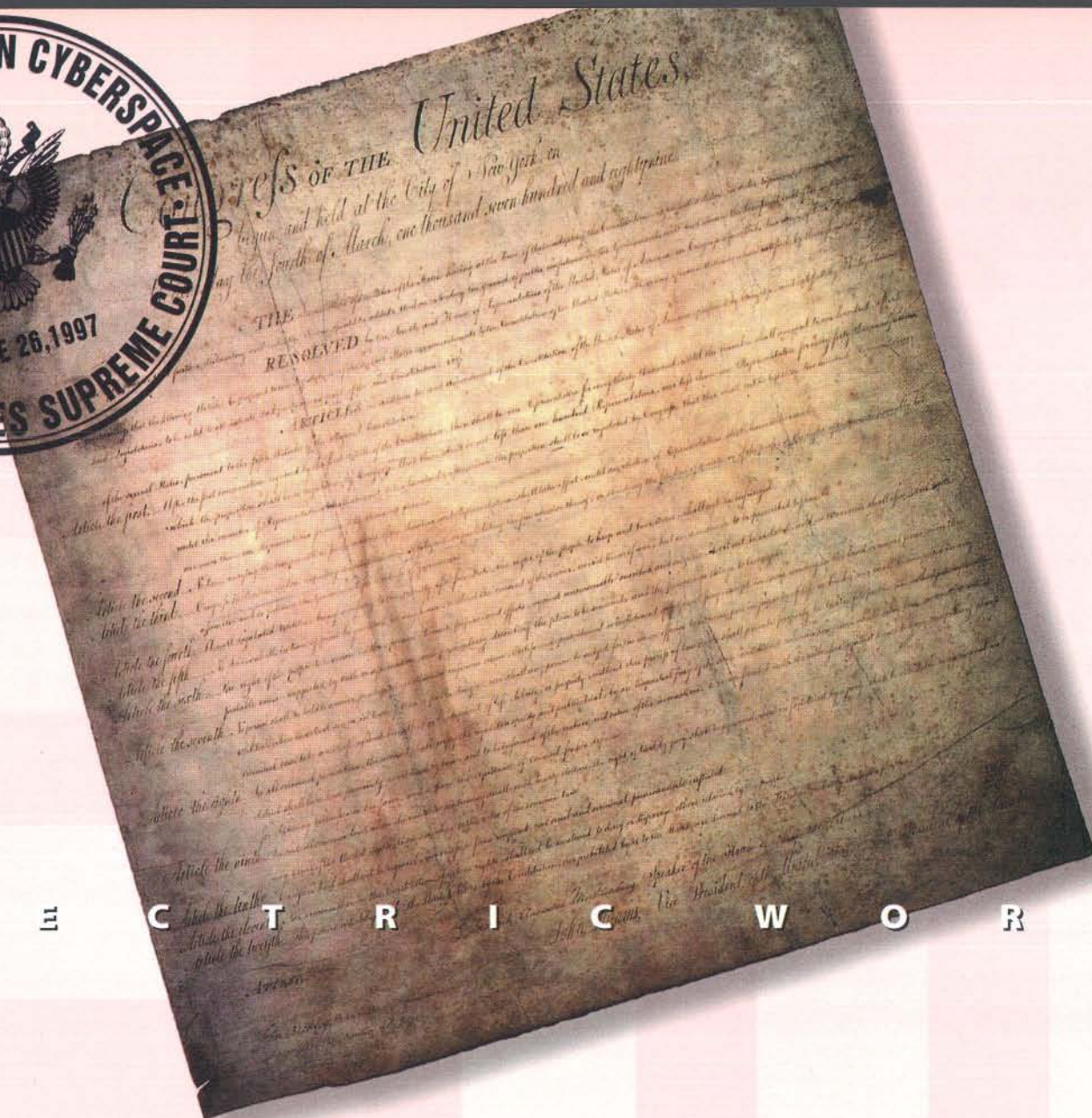
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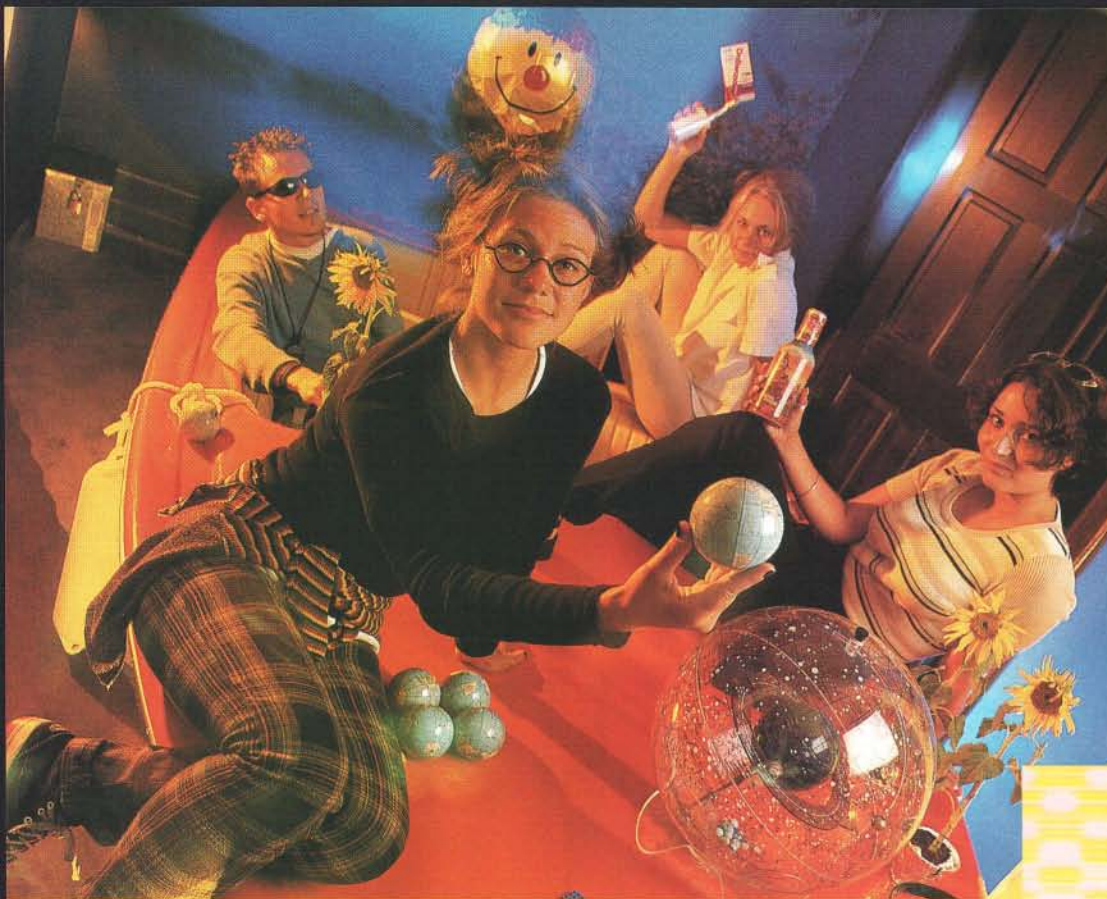
I L I C T R I C W O R D

High tech watchers who delight in corporate infighting and cutthroat competition are glued to a shakeout in the Internet search engine and directory market. In the race for dominance among the Big Five players, Infoseek and Digital's AltaVista may soon be shaken to the bottom.

While Yahoo!, Excite, and Lycos have cemented their top positions via strategic partnerships, and CNET's search.com and Wired/Inktomi's HotBot have successfully carved out niche markets, Infoseek and AltaVista have dabbled in several areas but dominate none. Worse, Infoseek has been beset by management turmoil: the company replaced CEO Robin Johnson with former CNN Interactive executive Harry Motro in May (Johnson stayed on as a consultant), then lost its COO/CFO and vice president of advertising four weeks later. And the big guns at AltaVista suffered a setback when parent company Digital aborted a planned spin-off and IPO. Infoseek and Digital are now praying that when the shakeout ends, the Big Five won't have become the Big Three. — Chip Bayers

Search Engine Shake Out





Kaos Kadets

When educators in Scandinavia decided its business schools were inadequate for the 21st century, they funded KaosPilot University. At campuses in Denmark and San Francisco, students delve into complexity theory and creative processes.

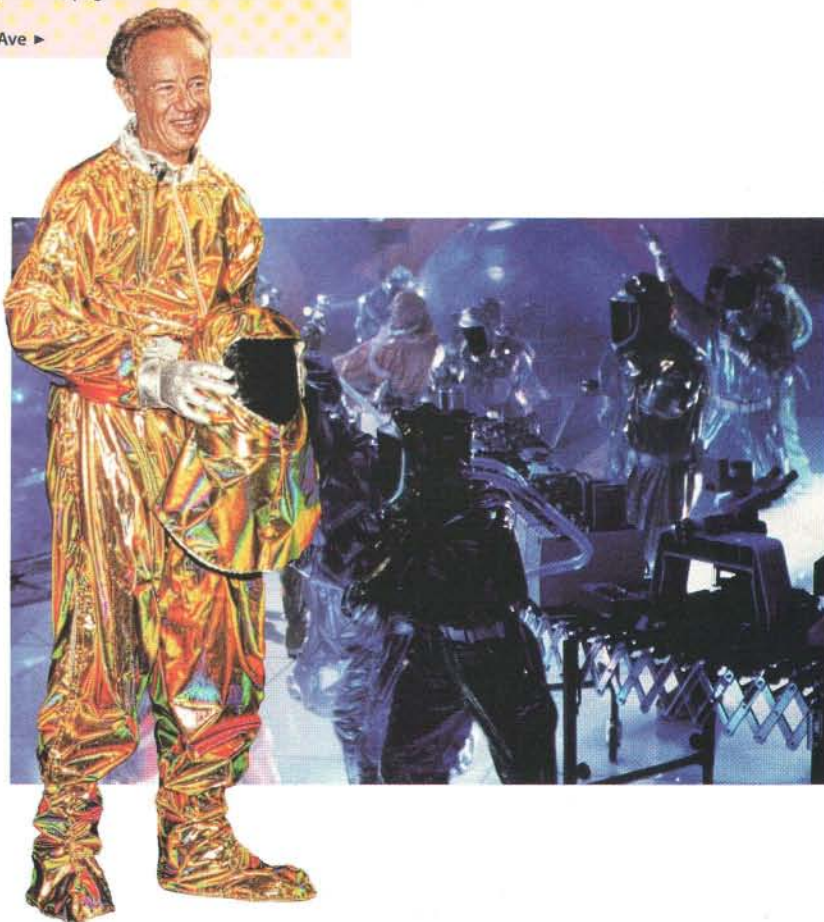
Conceived by Uffe Elbæk, a maverick educator, the university has 32 full-time students in San Francisco working as consultants on projects ranging from new media to new finance. The goal is to develop business models and learn team skills. Decentralized-system evangelist and Visa credit card founder Dee Hock is already a fan. Like many near-chaotic organizations, the university spends a lot of time figuring out what *it* is supposed to be doing. Welcome to the future, indeed. — *Kevin Kelly*

≡III Oh Bill, You Dork: We won the CDA fight, but we still have an obscene president. Here are some choice outtakes from Clinton's response to the Supreme Court's ruling: "We

can and must develop a solution for the Internet that is as powerful for the computer as the V-chip will be for the television." Remember the V-chip? That's the neat chip in every TV that automatically filters out all the nasty stuff. Piece of cake, right? Or how 'bout: "With the right technology and rating systems, we can help ensure that our children don't end up in the red-light districts of cyberspace." Yup, that's all it takes, a chip and some rating systems. Never mind the parents, the technology will do it for them. Thanks, Bill. For more on the CDA, see *Cyber Rights Now*, page 94. ≡III Indonesian Doubletalk: Earlier this summer, Indonesian minister of telecommunications Joop Ave ►

Intel Swipes an Apple

If Intel's gold-lamé dancing astronaut campaign wasn't clear enough, the company is getting more "extroverted." Long the silent partner in PC technology, Intel — along with its spiffy new Pentium II processor — took center stage at the Intel New York Music Festival in July, and its newfound exuberance is winning friends in an unlikely place: the Apple-allied arts community. The rock concert and cybercast series has been sponsored by Apple for two years, but technical glitches and Intel's "progressive" approach with artists convinced festival co-executive producer Andrew Rasiej to make the switch. "Intel's mantra is to never own media," he says. "Any tech company with that idea will find a friendly reception from artists." This is not Intel's first effort to woo artists. It established a media lab on the Creative Artists Agency lot, cosponsored Geocities' Best Unsigned Bands contest, and runs Mediadome.com with CNET. Rasiej admits that while most artists are loyal to Apple, they'll follow opportunities. "Do you know who makes your phone? No, it's just a tool," he says. "Artists are interested in tools, not platforms." — *Austin Bunn*



As if *Space Ghost Coast to Coast* weren't reason enough to tune into Cartoon Network, here's another: *Dexter's Laboratory*. This half-hour animated series about a juvenile mad scientist and his unwitting guinea-pig of an older sister is the brainchild of 27-year-old Genndy Tartakovsky, a Hanna-Barbera animator who moved to the US from Moscow in 1977.

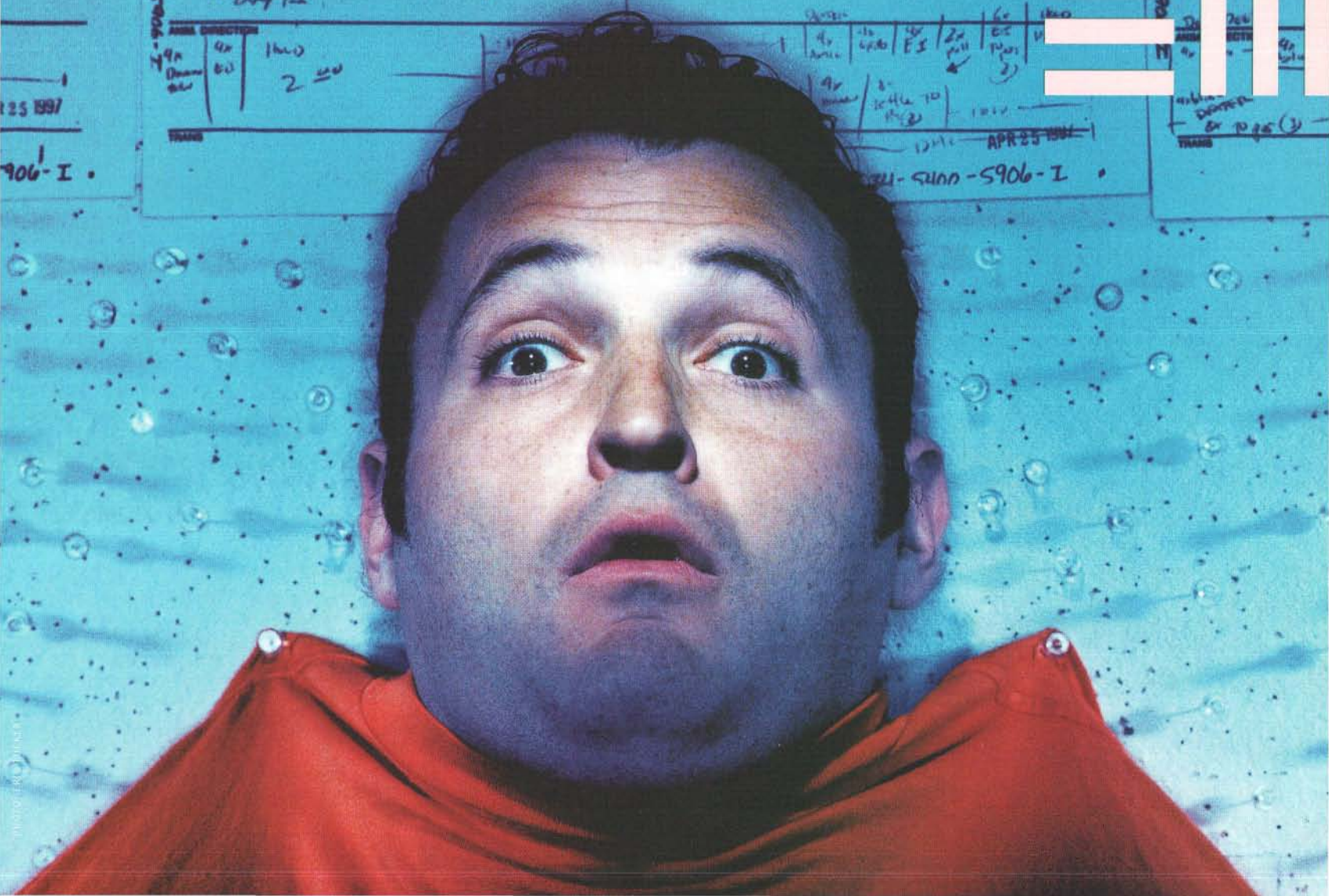
Tartakovsky draws from the beatnik-cool look of atomic-age cartoons such as *Gerald McBoing*

Boing and mixes in his own blend of quirky hyperkineticism and surreal perspectives. Whether his cantankerous boy genius is zapping his sister with a shrink ray or hallucinating his brains out after drinking his parents' leftover coffee, Tartakovsky creates *Dexter's* adventures solely for his own amusement. "I'm not being sincere if I'm doing it for other people."

Judging by the show's success – it was voted Number One Toon of the Year by viewers – this cartoonist's honesty is paying off. – Mark Frauenfelder

Genndy's Laboratory

III





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The virtual shrine is hosted and owned by Jeff Marcil, former infomercial producer and current AT&T Web Site Services customer.

"The Web is a natural extension of television. It's interactive and less expensive, and you can react to user feedback and change elements quickly," says Marcil.

And it's more dynamic and far-reaching than a hard-copy catalog. "With the Net, you can create the same elements as in a catalog at a fraction of the cost, revise more often, and reach a far wider audience. The Web is the best of both worlds."

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FIRING UP THE WEB

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GLOBAL CONFLAGRATION. A message this hot spreads like wildfire. "We're selling to Germany, Japan, the Philippines, even Iceland. More importantly, we're not just selling products, but building an affiliation with our customers. They're coming back for advice and tips, information and entertainment. We're getting to know them through the Web."

As for the Web details? Marcil leaves it to **AT&T Web Site Services**. After all, he's got a ministry to run.

And now that sales are part of Hot & Spicy Foods' Web potion, the company is depending on AT&T to keep the digi-dollars flowing. "AT&T's network is incredibly reliable. Twenty-four hours a day, seven days a week. I'm spoiled, I know."

And the customers keep coming. Hot & Spicy Foods is listed in the AT&T Toll-Free Internet Directory and regularly included in AT&T's massive coupon-mailing that reaches 600,000 web users.

Marcil also relies on critical information fed back to him by AT&T whenever he wants it dished up. "I know the number of hits I'm getting, and which pages are getting hit or skipped. With activity reports like this, I can easily adjust my marketing plan and hone my message."

HOTTER AND SPICIER. That's the message. Hot & Spicy Foods is merely the messenger, and AT&T the medium.

"AT&T has helped me from initial concept to overcoming the technical hurdles. From building a presence to attracting new customers. From the very first seminar to my plans for tomorrow. And when we've had a problem, a customer service rep has been right there to help." Now praise the Lord and pass the salsa.

Find out how AT&T can spice up your Web life, visit <http://www.att.com/easycommerce> or call 1 800 598-9283



New World Reorder

In June, the online, 3-D utopian sprawl called AlphaWorld appeared doomed to fade into a virtual ghost town. When AlphaWorld software developer Worlds Inc. was forced to sell out, the more than 110,000 cyberarchitects who colonized this virtual sphere found themselves lost in

cyberspace. But lucky for them, AlphaWorld resident and independent contractor Rick Noll and Worlds Inc. modeler Danny Viascas decided to play virtual Donald Trumps and max out their credit cards to buy AlphaWorld. "People view these homes as their possessions," says Noll. "This would have destroyed an awesome technology and torn apart our community." Their new San Diego-based company, Circle of Fire Studios Inc., now sells the software for people to build their own worlds. In just a few months, the community has exploded into its own universe with 160 new worlds, and the company has secured partnerships with bigwigs such as Boeing and Philips.

— Rachel Lehmann-Haupt

► declared access to information a "basic human right," then promptly announced that the government would restrict the growth of the Internet. With a population of 200 million and an aggressive plan to get wired, Indonesia can't afford that kind of backpedaling.

≡ Web Results: GUV's recent survey of nearly 20,000 Web users is a fascinating read (point your browser to www.gvu.gatech.edu/user_surveys/survey-1997-04/). Georgia Tech's Graphic, Visualization, and Usability Center has been running these surveys since 1994, and its depth of information has grown impressively over time. The first survey, in January of 1994, found only 1,250 Web servers online, and 95 percent of users were male. The most recent survey, done this spring, found more than 1 million servers, and only a 66 percent male population.

The survey points to a stabilizing population in terms of demographics as well. The summary notes, "Core demographic areas ►

MIT Goes Fishing

Taking cues from the underwater world, where denizens of the deep have been perfecting their swimming skills for millennia, MIT scientists are building a generation of nimbler, more efficient ships.

Powered by oscillating foils similar to a penguin's flippers, a prototype 12-foot vessel recently took its maiden voyage in Boston's Charles River. During tests, the Penguin Boat's onboard computer showed a 15 percent increase

in efficiency over other craft. "When a body moves through water, it is slowed by friction," notes project head Michael Triantafyllou. Fish, on the other hand, manipulate friction to their advantage.

Next, the scientists will create a 100- to 200-foot version. "If successful, the technology will be ready for real applications," Triantafyllou says. Then, "it will be up to the market to decide what it wants to build."
— Miguel Helft

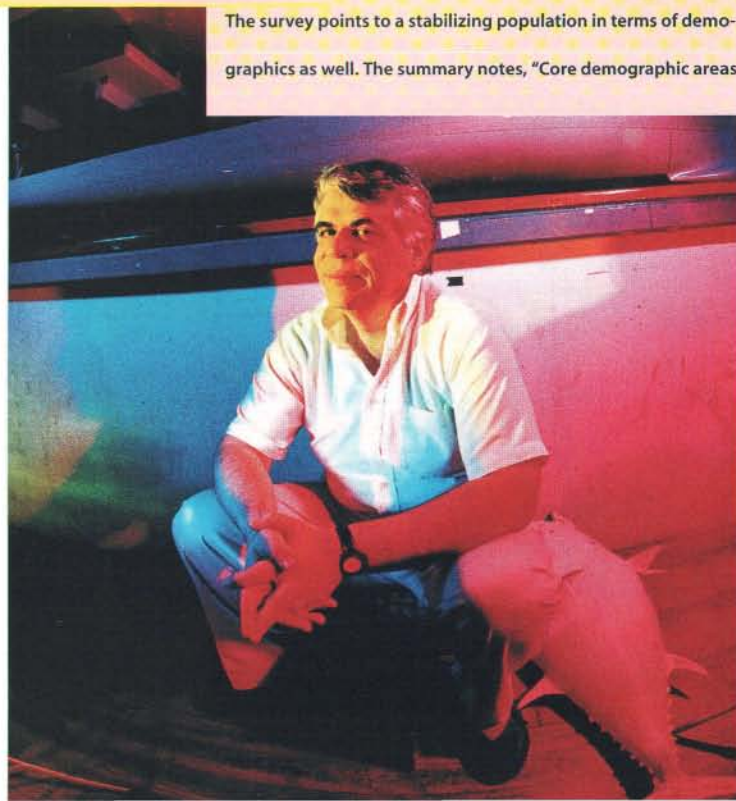


PHOTO BELOW: ASIA KERPKA



TIRED

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Routers
SoftWindows 95
Knee-jerk cynicism
Justice Sandra Day O'Connor
Hong Kong
Tiger Beat
Wildfire
Digital processors
Jackie Chan



WIRED

Microdistilleries
Active nodes
Virtual PC
Critical optimism
Justice John Paul Stevens
Macau
Hot Geeks!
Serengeti
Analog sensors/effectors
Johnny Yune

The Senate's Civil Liberties Slasher



Behind every bad law lies an aide who wrote it, and the Communications Decency Act is no exception.

In 1995, Senator James Exon (D-Nebraska) was the CDA's front man. But backstage, aide Chris McLean became known as the act's "chief architect."

Two years and millions of taxpayer dollars later, the CDA has been declared unconstitutional.

But McLean has resurfaced in the office of Senator Bob Kerrey (D-Nebraska), where he's helped draft the Secure Public Networks Act, a draconian bill that lets cops obtain decryption keys without a warrant.

Is McLean poised to continue his losing streak? Experts say his new bill may be unconstitutional on First, Fourth, and Fifth Amendment grounds. — Todd Lappin

Is McLean poised to continue his losing streak? Experts say his new bill may be unconstitutional on First, Fourth, and Fifth Amendment grounds. — Todd Lappin

► that used to undergo 10, 15, and even 25 percentage-point differences in a six-month period now typically see point differences under 5 percent." In other words, the Web is maturing both as a market and a medium. Other cool findings: Nearly half of all respondents say the Web makes them feel more connected to others; the average age of a Web user is just north of 35. ■■■ More Microsoft Lore: According to net.rumor, the latest Microsoft Internet Explorer advertisement features *Confutatis Maledictis* from Mozart's *Missa pro Defunctis* (translated, that's "Mass for the Dead"). When Microsoft's ubiquitous slogan "Where do you want to go today?" hits the screen, the music swells ►

Silicon Scenery



The producer of your TV series has champagne tastes, but your effects budget is decidedly beer. What to do?

If you're Flat Earth Productions, the solution is a virtual brew. For *Hercules: The Legendary Journeys* and *Xena: Warrior Princess*, the Burbank-based digital house made enhanced locations the next best thing to being there. For *Nightman*, its new series based on the Malibu comic, Flat Earth reinvents San Diego, where the show is produced, to look like San Francisco, where the story is set.

President Kevin Kutchaver boasts that the "guerrilla f/x unit" uses low tech tools, such as Macs, DEC Alphas, and AOL. "We put our money into talent, not hardware," he says. "The hardware has a way of catching up all by itself." — Paula Parisi

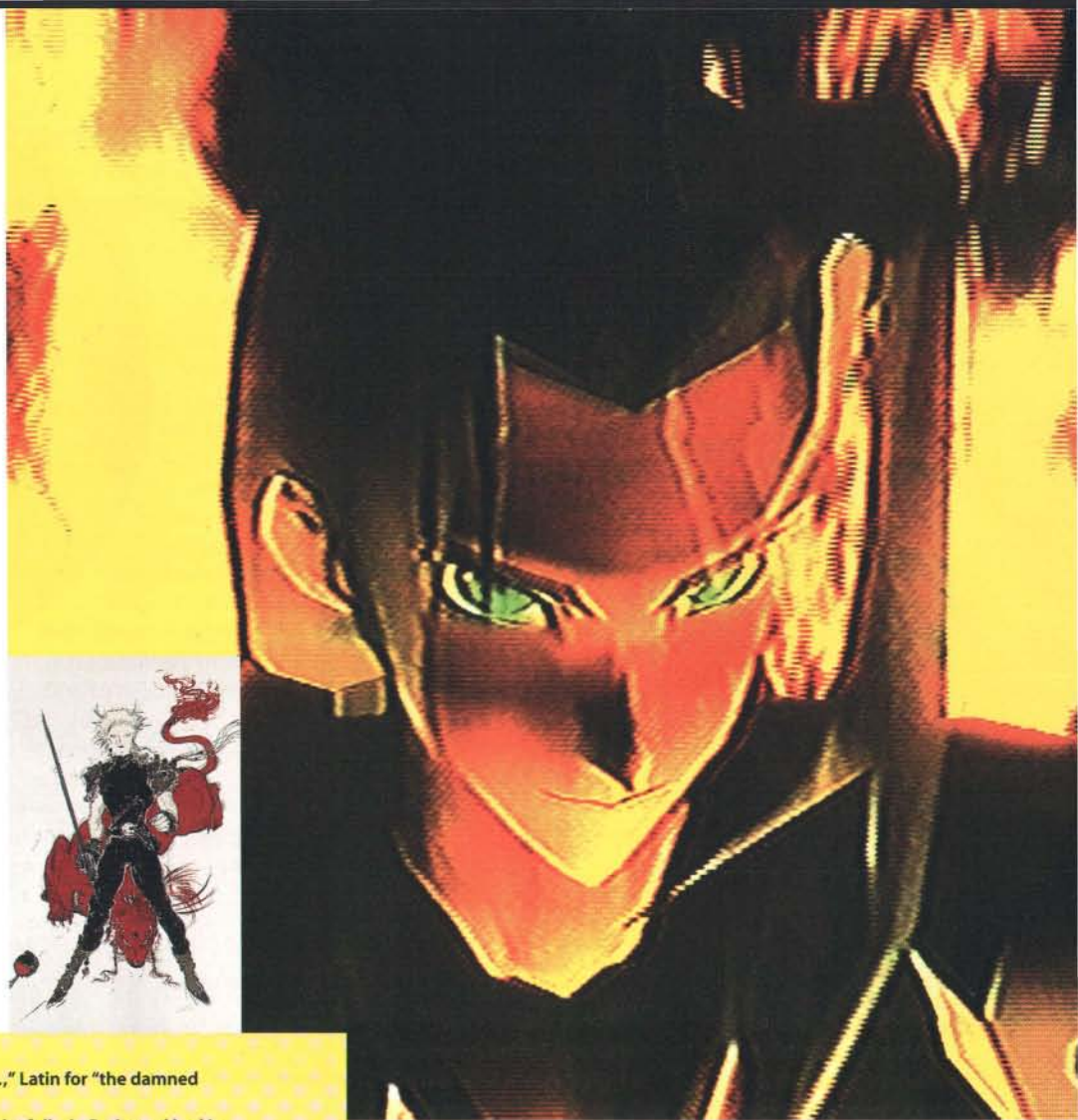
Amano's Armada

Crossing the boundaries of painter, book illustrator, videogame designer, and film animator has made Yoshitaka Amano a multimedia jack-of-all-trades, not to mention one of Japan's most successful and prolific artists. Now Amano is preparing to take the US by storm.

The first wave: *Final Fantasy VII*, a colorful role-playing videogame – debuting this fall – in which revolutionaries battle for a powerful energy source. The game sold 2 million copies during its first weekend on shelves in Japan and is expected to do rather nicely in the US.

His next trick: Amano, whose credits also include animating the Cannes Film Festival entrant *Tenshi No Tomago/L'Oeuf de l'Ange* (*The Angel's Egg*) and designing a stained glass window for the Yosei Museum in Japan, is creating a collection of "New York-size" paintings for a November exhibition. With 18- by 40-foot canvases, Amano is poised for a big splashdown.

– Julie Sullivan



► to the words "*Confutatis maledictis, flammis acerbis addictis ...*," Latin for "the damned

and accused are condemned to the flames of Hell." Not what the folks in Redmond had in

mind, we'd bet. ≡ Tunneling In: An insurgent email-based magazine has emerged from China. Called *Tunnel*, the new publication is put together by anonymous dissidents within China

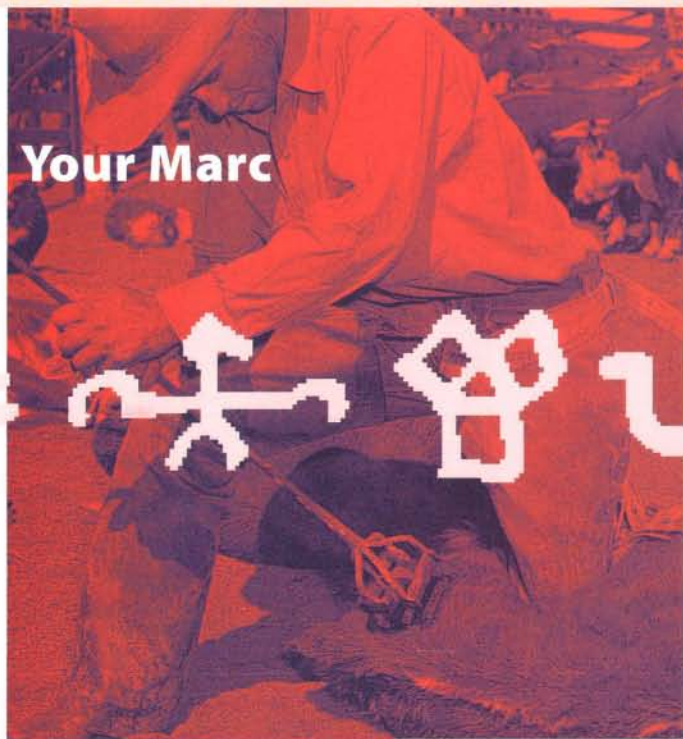
but sent from US-based servers. Launched on June 3 (the eighth anniversary of the Tiananmen Square massacre), the magazine included a rousing call for the end of communist rule and

limited freedom of information. "*Tunnel* is mainland China's first unrestricted magazine to be distributed by electronic mail, and its aim is to break through the present lock on information

and controls on expression," the magazine's inaugural statement reads. We

wish it well. For more information, send email to voice@earthling.net. ≡

Leave Your Marc



"Personally, I want to see where our company logo and images wind up on the Net," says Geoffrey Rhoads, inventor of the Digimarc method for hiding digital watermarks in images. Digimarc now offers a way to automatically track watermarked images across the Net, and clients such as *Playboy* have signed on in hopes of finding illegal copycats in the online blue trade.

But while wary corpora-

tions fear the Web as a giant xerox machine for copyrighted material and look toward Digimarc's new Net spider as a solution, Rhoads says his creation helps intellectual property grow. "Rather than be paranoid about infringement," he argues, "a lot of folks want to see how well their images spread over the Net. We turn paranoia into brand management and a way to get your name out there." – Bob Parks

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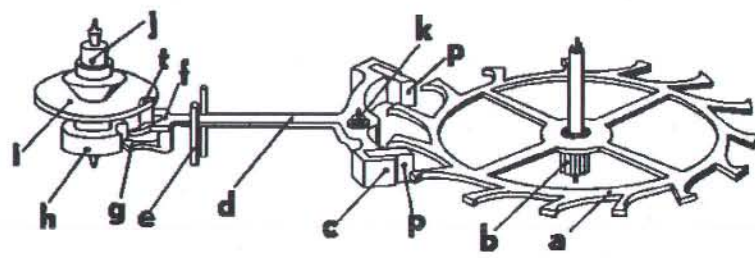
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Internet = Vice!

Not that smoking dope is necessarily a bad thing. (Particularly if you don't inhale.) But while earnestly trumpeting the Just Say No party line, the *Times* suggests that teenage drug use can somehow be attributed to the availability of drug literature online. It's a mind-bending assumption when you consider that, for the curious, the same information has always been as close at hand as the local newsstand or the kid next door.

"Partly owing to free-speech protection, the Internet lacks a quality-control mechanism to separate fact from hyperbole or from outright falsehood," the *Times* laments, "even in discussion that may ultimately encourage an activity that remains illegal." Perhaps when fortified with an ample supply of quotations from get-tough bureaucrats and hand-wringing policy wonks, such worries seem credible. But it's too bad our intrepid reporter never got up from his swivel chair to interview actual teenagers. Many would have offered him some good advice: "Chill out, dude."

The New York Times
FRIDAY, JUNE 20, 1997

NEW YORK, FRIDAY, JUNE 20, 1997

BY CHRISTOPHER S. WREN

By CHRISTOPHER S. WREN

Even as parents, teachers and government officials urge adolescents to say no to drugs, the Internet is burgeoning as an alluring bazaar where anyone with a high puter can find out how to get high on LSD, eavesdrop on what it is like to snort heroin or cocaine, learn the going price for marijuana or copy the chemical formula for methamphetamine, the stimulant better known as speed. Doctors need only retreat to

magine that has celebrated the marijuana culture for more than two decades and created a site of its own on the World Wide Web two years ago. "There are hundreds of pro-marijuana sites out there. I can't keep track of them," Alarms have rung in Congress and around the country about the risks that on-line pornography poses to the young. But few such warnings sound for what has become a virtual do-it-yourself guide to drug use, at a time when adolescents' experimenting is on

Teen-agers need only turn on their computers, boot up the computer, and click on a cartoon bumblebee named Buzzy to be whisked on line, through a graphic called Bong Canyon, to a mail-order house in Los Angeles that promises the scoop on "legal highs," "growing hallucinogens," "cannabis alchemy," and other "trippy, phat, groovy things."

Or they can download advice on cultivating marijuana plants from the Web page of HempBC, a store in Vancouver, British Columbia, that offers "everything marijuana- and hemp-related: bongs to books, clothes to cosmetics and more," including an assortment of hemp and marijuana seeds.

"Anybody can set up a website," said John Holmstrom, publisher of High Times, a monthly

gazine that has celebrated the marijuana culture for more than 40 decades and created a site of its own on the World Wide Web 10 years ago. "There are hundreds of pro-marijuana sites out there. I can't keep track of them." Alarms have rung in Congress and around the country about the risks that on-line pornography poses to the young. But few such warnings sound for what has become a virtual do-it-yourself guide to drug use, at a time when adolescents' experimenting is on the rise.

"We're really losing the war on the Internet," said Kellie Foster, a spokeswoman for the Community Anti-Drug Coalitions of America, which hopes to establish its own Web site next month. "We've got to get out there, and we're not."

The audience is certainly there. The Center for Media Education, a Washington group that monitors Internet content, reports that nearly five million children from 2 to 17 years of age used on-line services in 1996 and that more than 10 million college students

"We really are witnessing the development of the most powerful medium that has ever existed, in terms of its ability to attract and interest young people," said Jeff Chester, the center's executive director.

The drug culture on the Internet has proliferated in several ways. One is in the tolerance or acceptance of illegal

Ban on Ivory Trade Is Eased

Praise for my
toon from
High Times



Drug messages on the Internet, proliferating by the week, serve as an alluring bazaar to the young at a time of rising drug use among them. Those messages come from sources like the

Internet = Hackers!

New York Times articles about computer hackers often follow a predictable formula: three parts fearmongering to two parts salacious lip-smacking. The same recipe is favored by fire-and-brimstone preachers, and for good reason. Like the small-town evangelists who lecture on sins of the flesh, the *Times* understands that railing against unseen dangers is a sure-fire way to pull in the crowds.

Steve Lohr's article is a fine example of the genre. First comes the fearmongering, served up hot and steamy with hoary scenes of hacker tiger teams hunched over their keyboards while attempting to bum-rush a corporate firewall. Then comes a familiar litany of dark anecdotes (Russian hackers invade Citibank!) and back-of-the-envelope estimates that 440 bulletin boards and 1,900 Web sites purvey hacker lore.

Yet all that is just foreplay. The juicy bits arrive when our reporter describes the obscene amounts of money that computer security experts earn. Breathlessly, we are told that these experts can make more than US\$200,000 a year. But is this money well spent? "Just how great the threat is to corporate computer systems is a matter of debate," the *Times* admits. It's a pity we don't get to hear much of that debate — we're too busy learning that computer security consultant Nick Simich racked up 150,000 frequent-flier miles last year. Perhaps there's a morality tale the *Times* wants to convey: forget about breaking into Citibank — the real money is on the other side.

July 21, 1994
Computer Snoopers Imperil
Pentagon Files, Experts Say
By PETER H. LEWIS

March 17, 1997

Business Day

The New York Times

Feeling Insecure, Are We?

Go Ahead, Be Paranoid. Hackers Are Out to Get You.

By STEVE LOHR

In a chilly, windowless room in a New York suburb, four men are tapping furiously at their laptop computers. Their mission: crack into the computer system of a major American corporation.

Things seem to be going well, for them. "All right, we're through the firewall," announced one bearded hacker. A few moments later, a second practitioner of high-tech mischief pronounced himself pleased by what he saw inside — a digital picture of vulnerability rendered by the lines of computer code dancing across his screen. "Looks like we can toast it," he said.

Charles Palmer, a slender, bearded 40-year-old computer scientist, looked on with pride at the members of his team. Skilled hackers, Mr. Palmer noted, are scarce these days, at least ones that he will hire.

"It's hard to find good people in this field who do not have criminal records," he explained.

Mr. Palmer and his team work for the International Business Machines Corporation, and their brand of computer hacking is legal. Companies pay the I.B.M. squad to attack their computer systems to test how well they can stand up to the increasing assaults by real hackers. The growing ranks of cyberintruders are engaged in everything from snooping around to "parking" pornography and pirated software on unsuspecting corporate machines to computer-assisted fraud and theft.

White-hat hackers, like those at I.B.M., are only one kind of computer-security professional whose skills are much in demand today. Once an arcane specialty, computer security has moved into the mainstream. As companies rush onto the Internet, they benefit from improved communication with customers, suppliers and far-flung employees, but they also take on far greater risk that their corporate computer systems will be breached by outsiders with malicious intent.

The dangers of a networked world

Continued on Page 7

On Web, New Threats Seen to the Young

By SETH SCHIESEL

If cyberspace has become an after-school playground, parents may be surprised at some of the lurking there.

the Web features video clips of the Absolut bottle in witty disguises. The print versions of Absolut ads have become collector's items

March 7, 1997

messages touting drinking and smoking.

"The marketers of alcohol and tobacco see the Internet and the World Wide Web as a powerful

The cost of breaking into a corporate system: \$8,000 to \$10,000.

Chronology of Fear:

May 11, 1994

Anarchy, a Threat on the Electronic Frontier?

by Peter H. Lewis

December 31, 1994

Computer Jokes and Threats Ignite Debate on Anonymity

by Peter H. Lewis

February 11, 1995

Writer Arrested After Sending Violent Fiction Over Internet

by Peter H. Lewis

February 17, 1995

Hacker Case Underscores Internet's Vulnerability

by John Markoff

Internet = Wackos!

There is one essential truth about the Internet: it is irrepressibly and chaotically democratic. As US Supreme Court Justice John Paul Stevens recently observed, the Net enables "any person with a phone line" to "become a town crier with a voice that resonates farther than it could from any soapbox." Usually, that's a good thing. Sometimes it's not. Nevertheless, the Supreme Court concluded that the benefits of Internet free speech far outweigh the dangers. But to the *Times*, the Internet's populist cacophony can be a little, uh, menacing.

The Heaven's Gate cult suicides of last spring, for example, provided the tweedy gatekeepers of West 43rd Street with "one more shred in an accumulating pile of evidence that there are networks of people lurking out there with alien values, and that anyone, any age, might stumble onto them with a mouseclick." Superficially, this is simply untrue — nobody "stumbles onto" anything in cyberspace; you must request it first. But on a deeper level, it seems the *Times* can't separate the message from the messenger. Maybe that should come as little surprise — to the extent that any wacko uses the Net, it nurtures the anxieties of those who fear an open and frictionless marketplace of ideas. But in the end, articles that link the Internet to social pathology inevitably say more about the anti-democratic impulses of the people who write them than they do about the Internet itself.

Scared About The Internet

Continued From Page 1

acreage has been staked and furrowed for such respectable activities as collaborating on the Human Genome Project or trading recipes for German chocolate.

In the public mind — molded by news reports, media, which will more powerfully

using a computer to access the Internet. The horror stories about the crimes made possible by this powerfully anarchic technology pale against the news last week of a cult of Southern California computer geeks, who supported themselves by Web pages for businesses, committed suicide in preparation for a sci-fi version of the Rapture, in which they would be beamed aboard a U.F.O. behind the Hale-Bopp comet. Taking the drug with vodka chasers, they strangled in purple, and quietly the ultimate trip.

Will those 1's and 0's end up as a photo of a wildflower or a wild sex act?

missions from one foreign user to another frequently pass through are computer systems in

March 26, 1995

'There are probably no secure systems on the Internet.'

ors and other Federal agencies," Mr. [unclear] said.

July 21, 1994

Editorial and Op-Ed pages, 10-11
Education Advertising
Careers in Education and
Health Care Employment

March 30, 1997

The New York Times Week in Review

Image Problem

Old View of Internet: Nerds. New View: Nuts.

By GEORGE JOHNSON

FOR the techno-libertarians intent on keeping the abstract duchy called cyberspace the freest of all lands, the last few months have been a nightmare of bad vibrations rippling through what the electronic elite derisively calls the "old media."

Every few days, it seems, television news-casts and newspapers carry reports of unspeakable acts conducted over the Internet. Pedophiles and maybe even prisoners trade pornography and tips on kidnapping, while trying to seduce children in electronic chat-rooms. Right-wing lunatics post recipes for explosives and rouse their members with paranoid visions of immense conspiracies that only they can overthrow.

Earlier this year, the United States Parole Commission, alarmed at the flotsam fiber-optical pipes, added a new item to the list of things Federal parolees can be kept from doing: owning firearms, drinking to excess, consorting with criminals, and now,

Come visit my web site, kiddies, and I'll give you some candy.



What's Your Pleasure?

Cindi

Valley Girls

Chat

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Reverend's
The John Gotti Tribute

Free
John Gotti!



February 22, 1995

Business Technology:
Security is Lost in
Cyberspace

by Peter H. Lewis

March 13, 1995

Hate Groups Use
Tools of the
Electronic Trade

by Keith Schneider

March 26, 1995

Despite a New Plan
For Cooling It Off,
Cybersex Stays Hot

by Peter H. Lewis

July 23, 1995

Attack of the
Cyberthieves, and
Other Assaults

by Brett Brune

August 2, 1995

The Media Business:
Steady Gains by New
Media Pose a Threat

by Steve Lohr

Internet = Cheating!

Savvy teachers understand that students need sophisticated information-sharing skills if they are to prepare themselves for the future. But the *Times* reduced this educational paradigm shift to a front-page warning about stolen term papers on the Web.

Sure, the Internet makes it easier to crib term papers. But this doesn't mean that plagiarism runs rampant, and the *Times* hasn't offered much evidence that the Net has made cheating any more prevalent than it was in the days of Cliff Notes and classified ads in *Rolling Stone*. Instead, the Gray Lady tsk-tsks like a neurotic schoolmarm, warning of "term-paper mills and guerrilla operations set up by college students in their dormitories, altogether offering tens of thousands of term papers that can easily be downloaded and turned in by students as their own work."

Shocking? Perhaps to some. But it's just the latest variation of the age-old intergenerational blame game. Back in the 1950s, it was rock and roll. Then it was drugs and TV. Now it's the Net. Just as any communication medium reflects a range of social mores — good and bad — the Internet is no different. Meanwhile, this same technology is spearheading a dramatic social transformation that is poised to fundamentally rewire the structure of our educational system, our economy, our politics, and our civilization. That is front-page news. ■ ■ ■



December 8, 1996

On Internet, Term Papers Hotter Property Than Ever

Continued From Page 1

makes the on-line papers more a diversion than an invitation to wide-scale plagiarism. But the flood of information to be used or abused at sites with hundreds of thousands of viewers explains the ambivalence many educators feel these days toward the ubiquity of the Internet in academic culture.

"Sometimes the Internet is the library and sometimes it's the mall, and though I love big metaphors, I haven't found one for the Web," said Tom Reaching, director of the Center for Teaching at the University of Iowa, who has written a paper about the on-line term-paper sites. "It seems to be too many things at once to get into a metaphor."

"I know some faculty members think there's a real evil genie out there. I don't see a reason to panic, but it's definitely made something that's been out there in the past much easier to do."

It does not take an Internet wizard to find term papers on the net. Typ-

ing in "term papers" on any of the big search engines immediately brings up long lists of sites that sell or give away term papers or write them to order.

Whether it is "Post-Modern Ethnography," "Aphasia and the Acquisition of Syntax," "Theme and Imagery of Women in Dante, Petrarch, Boccaccio and Rabelais" or "Prenatal Care: A Cost-Benefit Analysis," papers on almost any subject are available for free or for sale on the Internet.

Sales of term papers are not new. Companies who do research have advertised on campuses and in publications like *Rolling Stone* for years. And every university has stories of fraternity-house filing cabinets stuffed with term papers.

What is new is the number of places where papers are available, the ease with which they can be obtained and the often brazen ways that do-it-yourself Internet sites now

flout the ability to cheat and plagiarize electronically.

Most established disclaimers, saying that the information can be used for research purposes but not submitted as a student's own work, though pur- chasers often have other intentions. It is illegal in most states to sell papers with the expectation that they will be handed in as students' work.

But many less professional sites are far less circumspect.

"So what time is it?" the Cheat Factory site reads. "When is that assignment due? When did you get the assignment? Oh well, what can we say, check out our files and take whatever you wish!"

Salvatore Ciampa, a 21-year-old student at York University in Toronto, who set up his fledgling site and to, who set up for papers, said he does not have time to put on his site all the papers coming his way and had no problem with students' choosing to use the papers as their own.

"I guess I just like the attention," said Mr. Ciampa, who said he was changing his major from economics to mass communication.

It is clear that at least some of the papers are finding their way into classrooms as original papers. Anthony Krier, a reference librarian at Franklin Pierce College in Rindge, N.H., said he had received more than 500 requests from teachers and deans, worried about plagiarism, for a list he had put together identifying about 50 Internet sites that offer term papers.

About 25 inquiries, he said, have come from teachers and professors who had already caught students using on-line papers under their own names. A handful of the requests for his list, Mr. Krier said, came from students, apparently seeking access to the sites for improper purposes.

"This seems to be snowballing," said Mr. Krier, who said that he now found twice as many sites as he did when he first looked in January. Often, the commercial sites charge \$8 to \$10 a page. Compounding the problem is the number of papers that are posted on academic or personal home pages.

Dorian Berger, who just finished his freshman year at Harvard University, said he had posted a number of his papers on the Internet so they could be read by more people. He said it soon became clear that his site had become a favorite of students had become a favorite of students trawling for good reports to copy or lift material from.

"I am now getting E-mails from people from around the world asking

June 12, 1997

LIVES ON FILE

The Erosion of Privacy
A special report.

emerged deeper
of vir

June 8, 1997

A CLOSER LOOK

Internet Access to Term Papers

There has been an explosion of Web sites that distribute some cases, sell term papers for legitimate or illegitimate sites allow users to view and use other people's research, condone plagiarism and others condemn it. Here are

Virtually Free ...

ACCESS Cheater allows complete access to its data base of reports after the user fills out a membership form. Each user is provided with at least one student term paper.

DOWNLOAD After establishing a password, users may search by subject category and download reports directly from the site.

... Or for a Price

ACCESS Termpapers-on-File also allows users to search its data base and even to view excerpts from reports

DOWNLOAD To download, the user must first purchase the report for \$8.95 per page.

for papers on every conceivable topic," Mr. Berger said, whose papers include "Confucianism and the Rise of Industrialism in East Asia" and "Darkness in Shakespeare's Macbeth." "I feel that I am some type of multinational cheating company when all I wanted to do was offer my papers as research information to people on the Internet."

While some educators are alarmed, many say the benefits of the Internet far outweigh the limitations.

Bruce Leland, an English professor who is director of writing at Western Illinois University, said the sites were a challenge to professors to do their jobs better. He said teachers were unlikely to be fooled if they tailored assignments to work done in class, monitored the students' progress — and were alert to papers that were radical departures from a student's past work.

October 22, 1995

Neo-Nazis Now
Network Online and
Underground

by Alan Cowell

May 23, 1996

Report Warns of
Security Threats
Posed by Computer
Hackers

by Philip Shenon

February 16, 1997

E-Mail is Becoming a
Conduit of Prejudice
on Many Campuses

by The New York Times

February 24, 1997

Man Charged
With Raping
Date He Met
From E-Mail

by Michael Cooper

June 12, 1997

Personal Files Via
Computer Offer
Money and Pose
Threat

by Nina Bernstein

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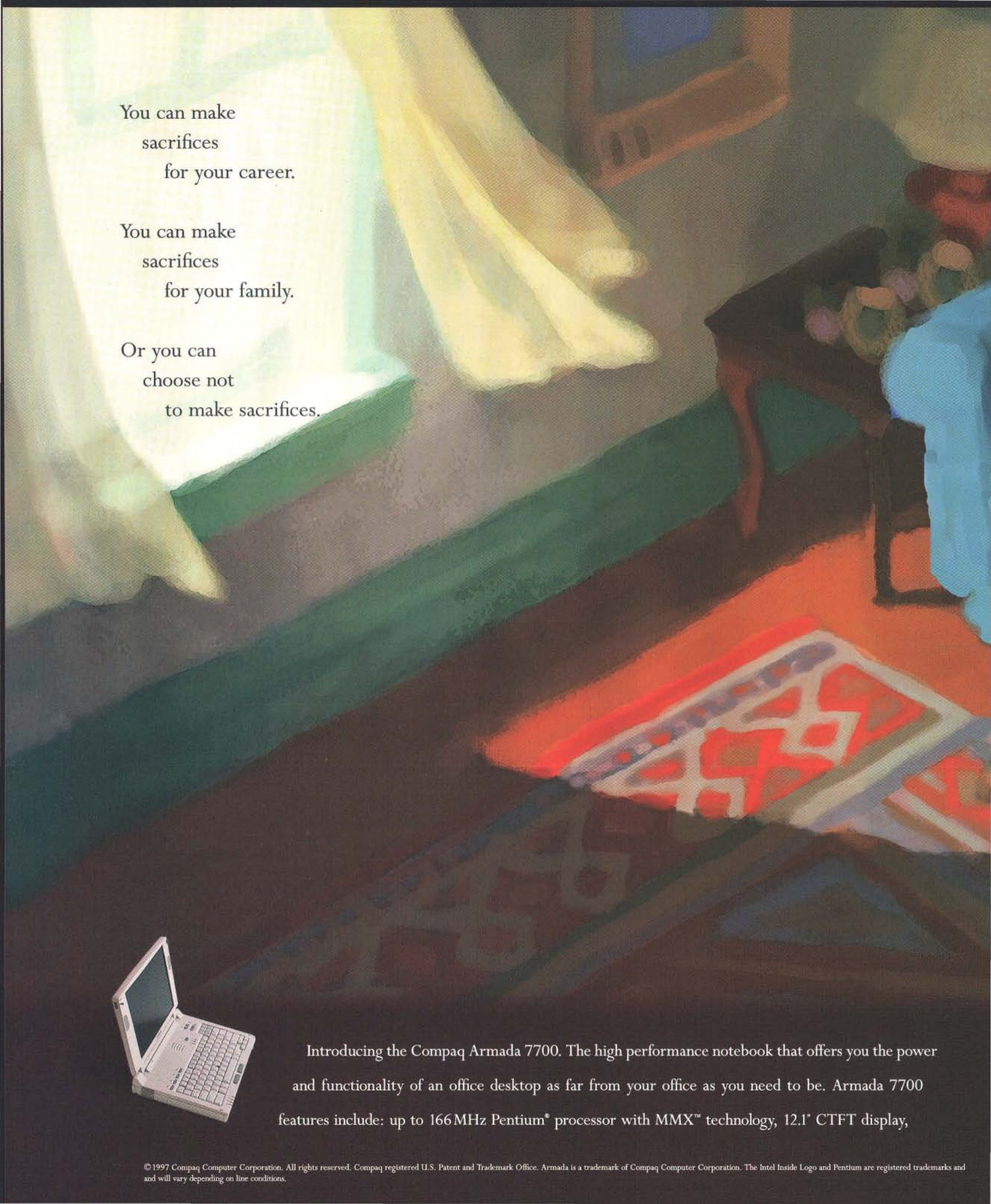
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Noise

Ignore any disturbing associations with Michael Jackson – the single Live Wire glove will probably make youngsters feel more like Darth Vader or Rocky. Contact points on the portable battery-powered toy let children make sound effects by touching an object. The sounds of a laser, a punch, screeching brakes, and a dozen other noises are available. While the glove will never kill the art of making a good machine-gun noise with your own vocal cords, it is louder. Keep in mind, what sounds way cool for kids may be torturous for adults. Live Wire: US\$19.99 to \$24.99. Mad Lab Toys: +1 (206) 448 1210.

Wizard

When you play arcade pinball, the tilt is often much too sensitive to really jerk the machine sideways enough to save a ball from dropping in the gutter. But Saitek's pinball lets you do whatever it takes to win. It has three tilt sensitivity levels, stereo sound, a choice of background music, and a chance for a bonus ball. It even saves your all-time high score for posterity. When you're done, just detach the legs and put it away. Like the old song says: "Ain't seen nothing like it in any amusement hall." Pinball machine: US\$299. Saitek: (800) 452 4377, +1 (310) 212 5412.

F E T I S H

Light

Just think, if all your furniture were inflatable, you could set up a comfortable home, anywhere, in a flash. The blowup chair from Inflate – a British design firm known for making lighter-than-air home furnishings – comes in a flat, shiny package. Simply assemble the sturdy, chrome-plated frame and take a deep breath. Each cushion is sealed separately in thick-gauge polyvinyl chloride. If you plan to purchase more than a few of these seats, you may want a bike pump, too. Inflate chair: US\$600. New York Museum of Modern Art Design Store: +1 (212) 708 9669, on the Web at www.moma.org/.

Bake

While most microwaves have only a few settings for making popcorn and defrosting rump roast, Sharp's Multiple Choice radar range comes with an outsize LCD and a microbrain storing hundreds of recipes, cooking tips, serving ideas, and an onboard instruction manual. It knows how to bake everything from poached shrimp and rumaki to jelly fluffer nut squares and apple pie. It can even make a kid's crusty old Play-Doh pliable again. But despite all that technology, it still can't make toast. Multiple Choice: US\$199.95. Sharp: (800) 237 4277, on the Web at www.sharp-usa.com/.

Edited by Bob Parks

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Jolt

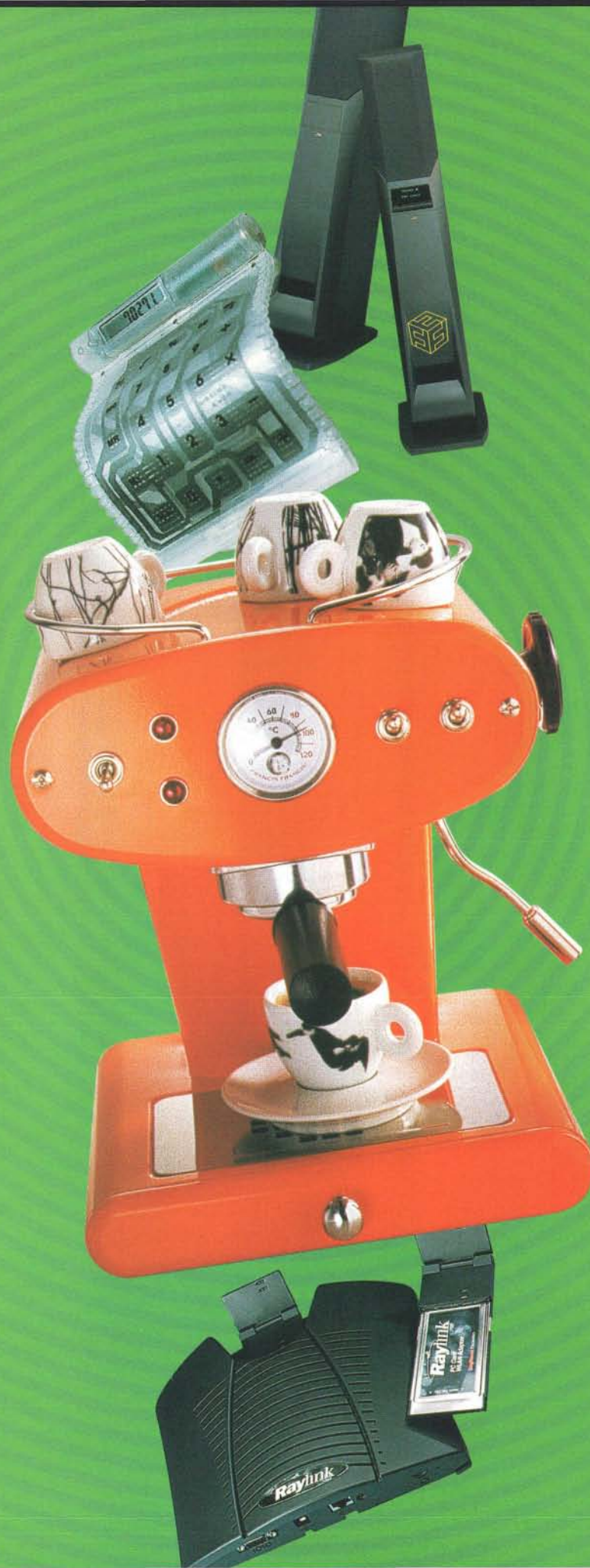
If you lived in the Jetson house, a FrancisFrancis! Espresso Machine would undoubtedly grace your space-age kitchen. Of course, Rosie the robot would also prepare your cappuccinos and lattes, but you can't have everything. The Espresso Machine, with its retro-futuristic look, fits into any decor. But best of all, its preground, pre-measured "pods" of espresso are completely idiot-proof and mess-free. It's a concept that could go a long way with the pompous baristi at espresso joints, but it goes even further at home. FrancisFrancis! Espresso Machine: US\$500. Williams Sonoma: (800) 541 2233, +1 (415) 421 7900.

Surrounded

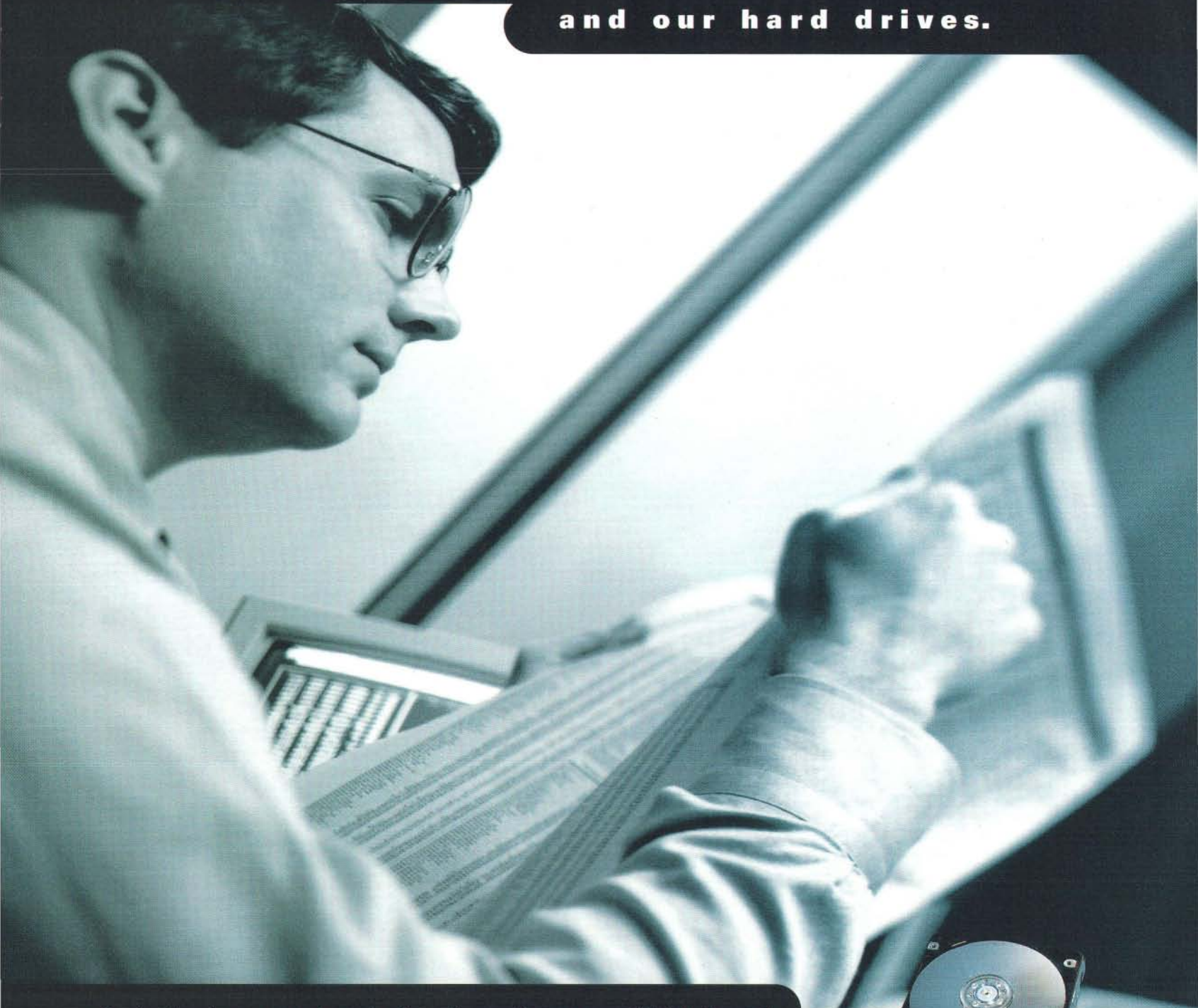
Most expensive home surround sound systems make you think celluloid dinosaurs are breathing down your neck. JVC's system goes one better – it makes you think you've bought five speakers when you've really paid for only two. JVC's SX-PRO3 is the first speaker to use the Dolby Pro Logic chip for a virtual home theater setup. Two speakers sit in front of you, but the processor tricks your ear into thinking you have speakers behind your head. With a 25-watt amplifier built into one of the speaker towers, the unit plugs right into a TV or VCR and saves you the hassle of rigging wires all over your living room. SX-PRO3: US\$799. JVC: (800) 526 5308, +1 (201) 794 3900.

Roam

Sure, Superman can see through walls, but can he grab data through them at 2 megabits per second? Raylink's small flat-folding antenna connects to your laptop and lets you graze from office to office, feeding off the company server all the while. Access Point works up to 500 feet inside the building, and it's the first wireless gizmo at those speeds to use frequency-hopping spread spectrum – the Kryptonite you need to keep corporate sneaks from seeing your data. Raylink Access Point: US\$1,495. Raylink PC Card: US\$550. Raytheon: +1 (508) 470 9095.



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Consolidate

Despite all the hipty-doo over the "convergence" of entertainment devices and the pretentious spelling of its name, PC Theatre is an improvement over Web TV in one big way – it obeys the separate display modes for computer monitors and TVs. The unit's noninterlaced screen automatically shifts resolution when going from displaying your data to showing your favorite sitcom. This way, surfing the Web isn't like trying to read the small fuzzy print on the Home Shopping Network. PC Theatre: US\$4,999. Compaq and RCA: (800) 345 1518, on the Web at www.compaq.com/.

Snooze

It's bad form to slump over during an important sales meeting. But this little wristwatch will keep you from adding insult to injury – Harmony Sleep Companion will wake you when you start to snore. It listens for repetitive sounds and rouses you with a gentle vibration to the wrist. The snore sensitivity level is adjustable from slight murmur to full-on buzz saw. A side button also lights the LCD face for nighttime use. In the morning – or after the meeting – you can check the built-in counter to see how many times you set it off. Harmony Sleep Companion: US\$59.95. The Sharper Image: (800) 344 4444, +1 (415) 445 6000.

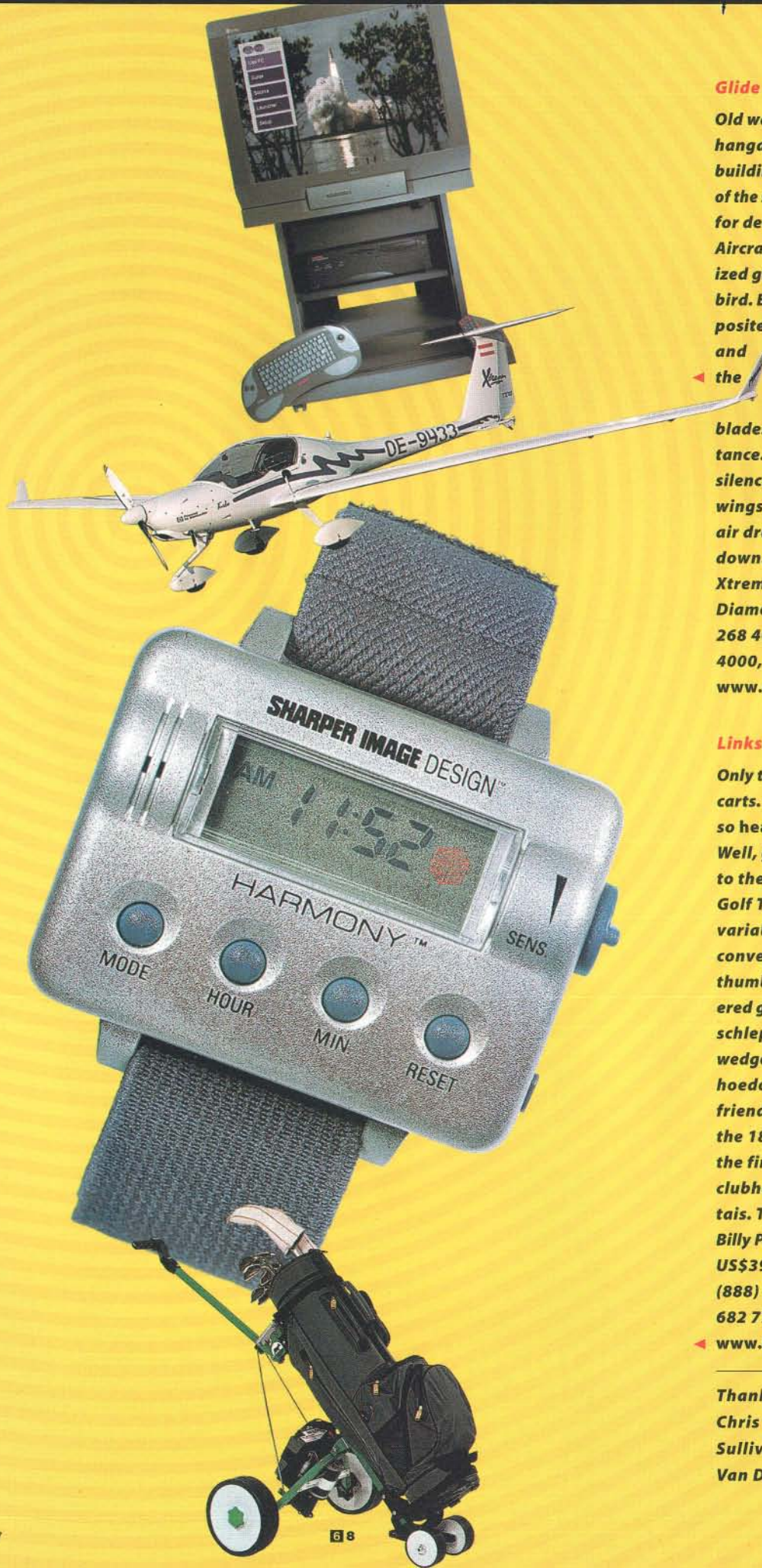
Glide

Old warbirds and airport-hangar lizards have been building slight variations of the same aircraft designs for decades, but Diamond Aircraft's two-seat motorized glider is truly a new bird. Bring this all-composite frame to altitude and start feathering the prop – that is, flatten the propeller blades for less air resistance. Then, in complete silence, let the 55-foot wingspan catch thermal air drafts on your way down. Katana Turbo Xtreme: US\$125,000. Diamond Aircraft: (800) 268 4001, +1 (519) 457 4000, on the Web at www.diamondair.com/.

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Thanks to Tim Barkow, Chris Rubin, Jennifer Sullivan, and Duncan Van Dusen.





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Scarlet Letters

With DNA fingerprinting and computer databases, technology increasingly is being used to help put criminals behind bars. But in a high tech twist, anyone with a modem may soon be able to help keep them there.

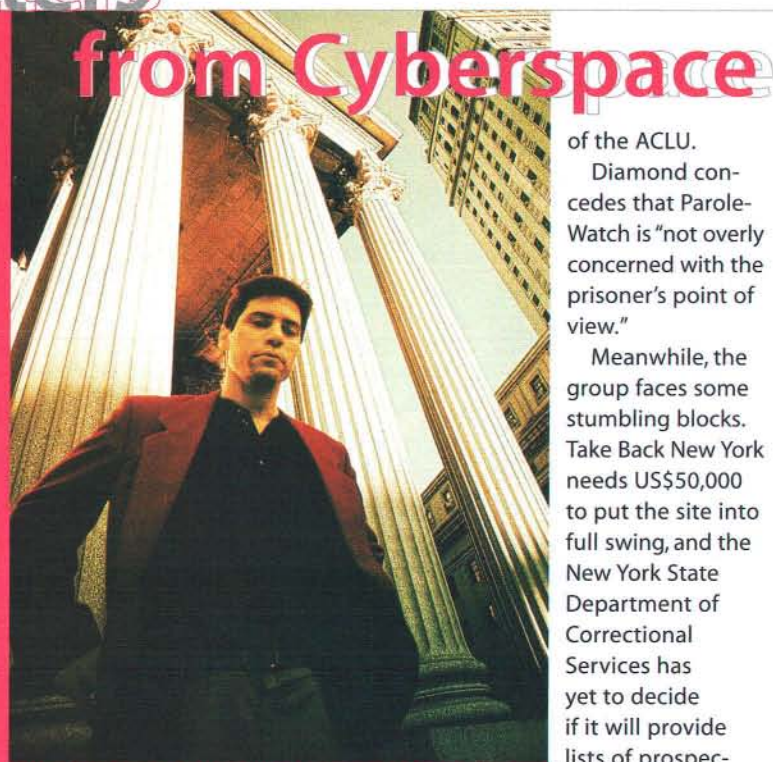
The victim's rights organization Take Back New York is planning to launch a Web site called ParoleWatch (www.parolewatch.org/) to list the names and backgrounds of rapists, murderers, robbers, and child molesters who are eligible for parole from the New York State prison system. The site will encourage Jane and Joe Citizen to read about a prisoner's crimes and then fire off an email objecting to their release. Joseph Diamond, executive director of Take Back New York, believes ParoleWatch will advance the victim's advocacy movement by allowing thousands of Internet users to express their outrage about crime. "This way," Diamond says, "the parole board knows the public is paying attention."

ParoleWatch plans to list the names of violent criminals who will soon be eligible for parole.

The American Civil Liberties Union is paying attention, too, and it sees a problem. ACLU officials haven't challenged ParoleWatch's plan to publish the names of prospective

parolees – that's public information. But it wonders if concerned citizens will be qualified to judge whether

a prisoner is fit for release, given that ParoleWatch describes only their violent past, not their behavior in prison. "The point of parole is determining the prisoner's current state of mind," says Jenni Gainsborough



Joseph Diamond dishes out his own style of justice.

of the ACLU.

Diamond concedes that ParoleWatch is "not overly concerned with the prisoner's point of view."

Meanwhile, the group faces some stumbling blocks. Take Back New York needs US\$50,000 to put the site into full swing, and the New York State Department of Correctional Services has yet to decide if it will provide lists of prospective parolees.

Logistics and thorny questions of justice aside, Diamond thinks ParoleWatch will both clean up the streets and polish the Internet's image. "The Internet has gotten a bad rap with all the talk of pedophiles and Heaven's Gate. What we're doing is pro-society, pro-community," he says. "If you take a poll of average Americans, most would say, 'Now this is a great use of the Internet.'" – Matt Richtel

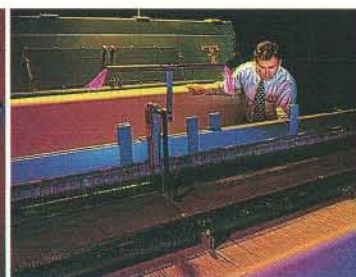
Fuzzy Fabrics

High production costs are the bane of the US textile industry. To bolster competitiveness, researchers have developed a real-time, online manufacturing process that uses fuzzy logic and advanced imaging to detect costly fabric flaws.

Faulty cloth is responsible for 85 percent of garment industry defects, but manual inspectors find abnormalities only after a roll has been produced. This automated inspection system uses small cameras and a computer to swiftly compile and analyze textiles. When a flaw is detected, the loom automat-



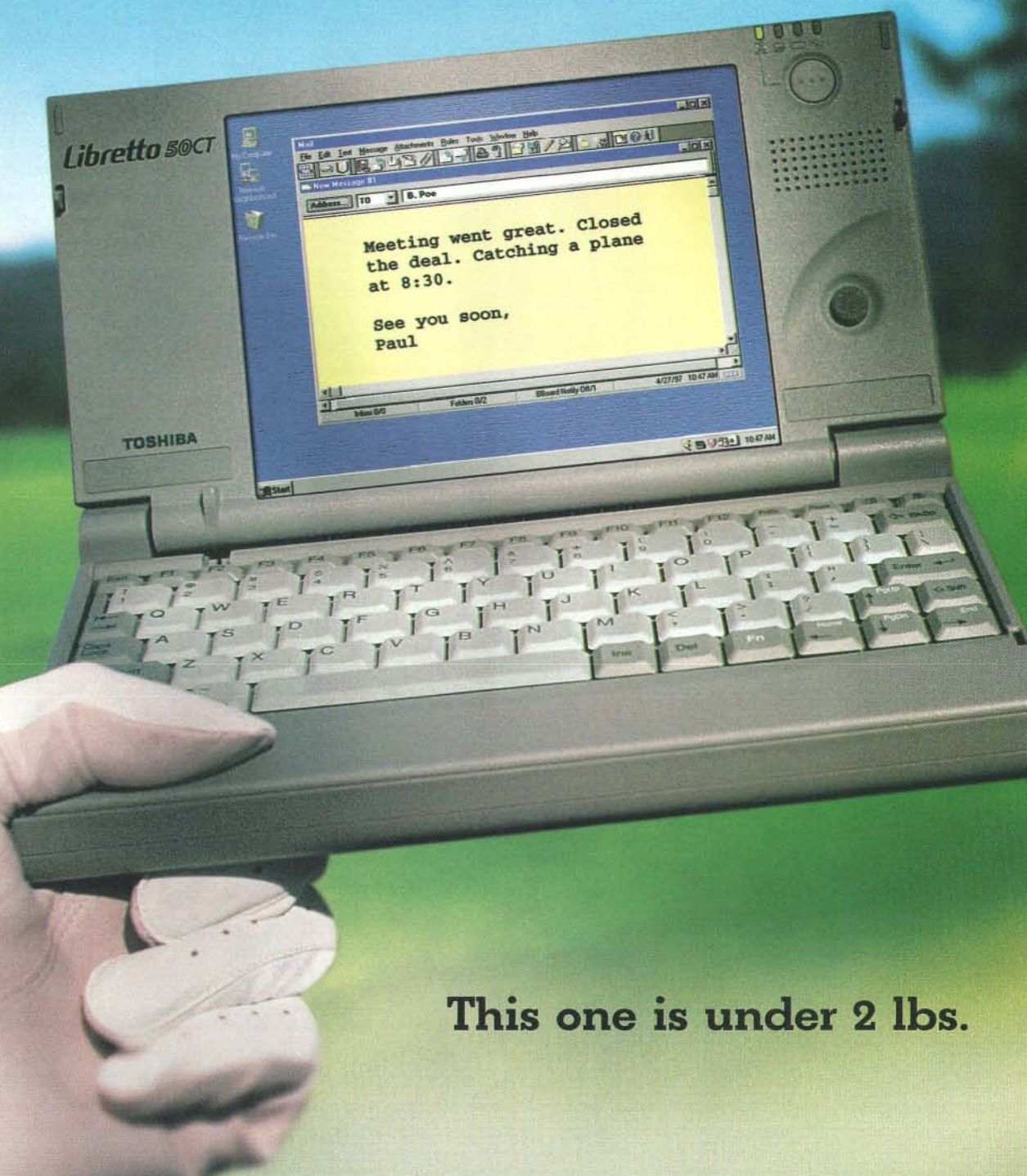
Finding fault, one stitch at a time.



ically shuts down until the problem is corrected.

"The broader implications of this technology are huge," prophesies George Vachtsevanos of Georgia Tech. "It will affect quality control in the paper, glass, and metal industries. These imaging techniques may even help detect cancer cells." – Anne Speedie

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Web Tab in Scandal Grab!

From a ramshackle Victorian in San Francisco, editors Ken Layne and Charles Hornberger are cranking out the Internet's only daily international rag sheet. Produced with help from a secret team of disgruntled international correspondents – most of whom toil by day for “respectable” news organizations – each issue of *Tabloid* (www.tabloid.net/) delivers screaming headlines and crisp dispatches recounting disaster, political fraud, and human folly.

Tabloid has found an eager audience. Page impressions have climbed to 40,000 a week and continue to grow steadily. “News-papers bleed all the life out of stories,” Layne says. “But we have no problem calling someone a bum if that’s what they are. We want to give a moral voice back to the daily news.” – Alex Salkever



Hard boiled: Ken Layne (left) and Charles Hornberger.

Connecting to Cambodia

The typically loud and chaotic way of life in Phnom Penh, Cambodia, was rudely interrupted one day last May by the sound of explosions coming from nearby Pochentong Inter-

manager, heard the explosions – assumed to be a result of factional fighting – he ran for the door. Moa rushed home to find his family anxious, but uninjured. Meanwhile, CamNet’s market-

fort zone.” Shortly after arriving in Phnom Penh, she met an official with The International Development Research Center, a Canadian company that helped launch CamNet in partnership with Cambodia’s Ministry of Post and Telecommunications. The organization needed someone to market Net access, and Skugstad signed on for the job.

She thinks the ISP is in a great position to introduce Cambodia to the Net. But Moa, her Cambodian colleague, feels less evangelical about CamNet, largely because the country’s needs are so overwhelming. The Khmer Rouge tried to obliterate Cambodia’s intelligentsia in the 1970s, resulting in the deaths of more than a million people. Civil war broke out after the Vietnamese invaded to stop the slaughter.

Skugstad had come to admire how Cambodians have adapted to so much uncertainty. Nevertheless, in July as the fighting in Phnom Penh grew more fierce, she was advised to leave the country.

Skugstad says she plans to return, but in the meantime, CamNet will continue. “Those who use our service need the connection now more than ever,” she says. – Jim Nash

Jargon Watch

Brains on a Stick Highly intelligent experts brought in to work on special projects for which expertise is more important than social skills.

Flies Venture capitalist jargon for Internet start-ups: you give them some money, they buzz around for awhile, and then *splat!*, the market swats them into a greasy little stain.

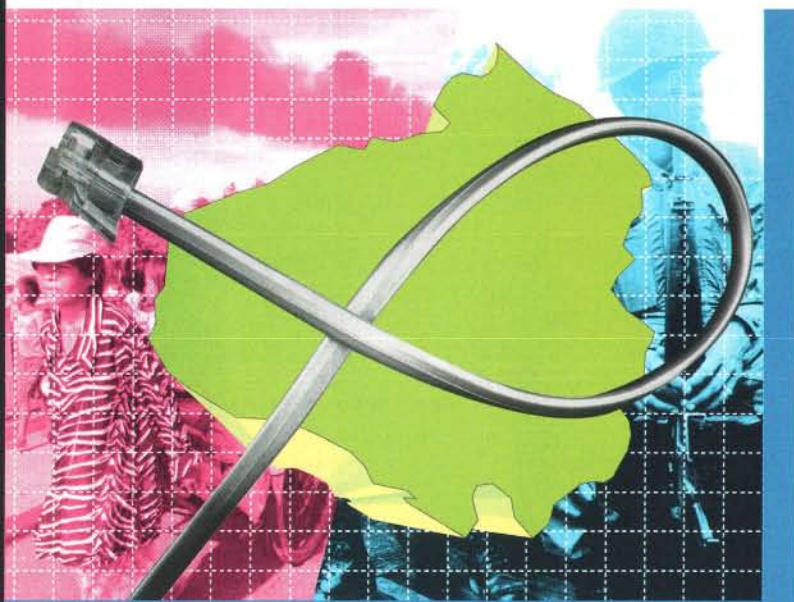
Genetic Discrimination To deny health insurance, health care, employment, or other opportunities and services to an individual who has a family history of genetic disease.

Laggot A person with a poky Net connection who uses an online gaming service. Laggots are the focus of much frustration and hatred because they slow the pace of gameplay for other participants.

Microstar A person who becomes well-known and well-loved, but only within a small media universe such as the Web, the zine scene, or cable access television.

A tip o’ the brain bucket to Tim Blain, Chris Fralic, and Lord Dragen.

– Gareth Branwyn (jargon@wired.com)



Life during wartime: CamNet provides a link to the world.

national Airport. Only a few days before, CamNet (www.camnet.com.kh/), the nation’s

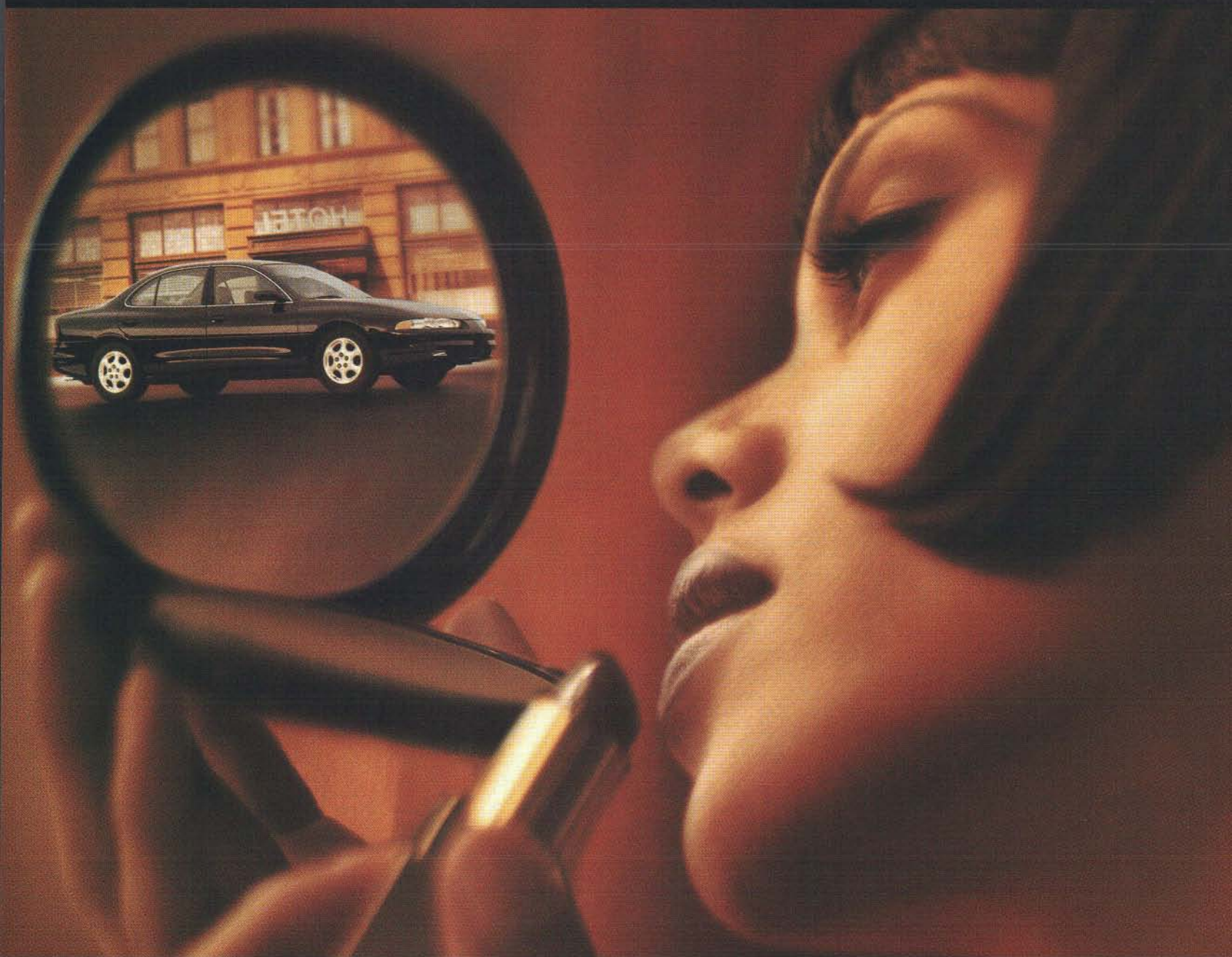
ing director, Ellen Skugstad, watched as the city’s streets drained of people. Skugstad

CamNet, Cambodia’s first ISP, must adapt to factional violence in Phnom Penh.

first Internet service provider, had opened for business.

But when Chakrya Moa, CamNet’s network operations

says she left her stateside job as a district sales manager for *MacUser* and *MacWeek* magazines to “move out of my com-



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The Empire State wants to be the first to legalize online gambling in America.

Whether the plan will actually work is a 100-to-1 longshot. Even under existing law, interstate gambling is permitted if a type of betting is legal

It's easy to understand why the Empire State wants to be the first out of the gate to legalize online gambling in America – its racetracks handle

nearly 20 percent of all horse bets nationwide, and the state government takes in about 3 percent of the more than US\$2.6 billion wagered annually at its prestigious race parks, including Aqueduct, Belmont Park, and Saratoga. The prospect of attracting a global crowd of

younger, more affluent, Internet-savvy gamblers to New York's virtual betting windows has Republican Governor George Pataki and the state's legislature seeing dollar signs.

odds, and track conditions. Ron Luniewski, president of You Bet!, argues that the information-intensive nature of the sport means that "horse racing is perfect for the PC."



Showdown: Senator Jon Kyl (left) and Governor George Pataki.

If the alliance with New York doesn't pay off, You Bet! could go under. But if the plan works, the company could be the software industry's next bolt from the blue. A study commissioned by You Bet! found that nearly 700,000 people already use their computers to get racing information, including horse and jockey performance, live

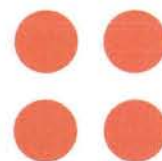
So far, the Feds can only throw up their hands. "Gambling is illegal except where it is allowed by the states," says a spokesperson for Senator Kyl. "If a state can figure out a way to do it over the Internet, and it doesn't infringe on rights of other states, then there's nothing we can do." Except, of course, continue to pretend that governments can control the Net.

— *Evan I. Schwartz*

International space companies/1996 rank

Company	Country	Space Revenue
1. Lockheed Martin Corp.	US	US\$7,500
2. Hughes Electronics Corp.	US	US\$3,540
3. Rockwell International Corp.	US	US\$1,960
4. TRW Inc.	US	US\$1,707
5. Boeing Co.	US	US\$1,557
6. McDonnell Douglas Corp.	US	US\$1,433
7. Arianespace	France	US\$1,423
8. Matra Marconi Space	France	US\$1,345
9. Daimler-Benz Aerospace	Germany	US\$1,320
10. Aerospatiale Espace & Defense	France	US\$1,283

– Gareth Branwyn



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Microsoft

The Wild

There's a two-week waiting list to get a password to the MUD called Krebbsville, although this virtual town doesn't have the usual assortment of castles, dragons, or wizards. Instead, it is constructed around familiar landmarks – a coffee shop, a library, and a pizza parlor. The attractions may seem banal, but for many of the hamlet's habitués, such places are the stuff of wild fantasy.

Krebbsville (www.algy.com/anxiety/talk.html) is an online community created for people who experience severe panic disorders and agoraphobia – the fear of being caught in crowds, public places, or open areas. Between 15 and 20 percent of this virtual town's citizens suffer from a paralyzing anxiety that keeps them completely confined to their homes,

Krebbsville is an online community for people who experience severe panic disorders.

and the rest are "functional to various degrees," according to founder Steve Ward. Some have handles like housebound2, jumpy, and CantGoOut.

A college art teacher from Tennessee, Ward started Krebbsville in

Indoors

1996. With help from volunteers, the MUD grew quickly. But on the heels of success, some worry that the last thing agoraphobics need is yet another reason to stay indoors. One woman who spends up to eight hours a day on the site admits, "I hate to leave the house even when I can because I want to be in Krebbsville with my friends."

Still, media psychologist Sanford Rosenberg of Media Research Associates argues that a virtual life is better than no life at all. "If Krebbsville is the only place where they actually talk to other human beings, then it's better than nothing," he says. "Without the Internet, they'd just be watching TV."

Watching the tube is exactly how 29-year-old Jodi Rosluk spent her days before discovering Krebbsville. A pastor's wife in rural Saskatchewan, Rosluk has a social phobia



Steve Ward makes the mundane seem manageable.

and no close friends. But in Krebbsville, she became the social director, in charge of making newcomers feel comfortable.

"I've really blossomed," Rosluk says. "The only problem is that my husband gets jealous because I would rather spend time with friends in Krebbsville than with him."

For some, a foray into Krebbsville's virtual world stimulates a hunger to get out into the real one. "There's even been a romance or two," Ward says. "The lure of sex was greater than the fear of the outside world."

– Michelle Goldberg

The Wired Interactive Technology Fund (TWITS)

Company	Primary Business	Symbol	Shares	Close July 1	Δ Since Jun 2	Action
Adobe Systems Inc.	Software	ADBE	5,000	34 1/4	– 10 1/16	hold
Applied Materials Inc.	Semiconductor equip.	AMAT	3,000	73 1/16	+ 6 1/4	sell
Diamond Multimedia	Multimedia hw	DIMD	7,000	7 1/16	– 1 1/16	sell
Informix	Database sw	IFMX	6,675	9 1/32	– 1 1/32	hold
Intel Corporation	Microchips	INTC	1,500	139 1/16	– 10 1/16	hold
LSI Logic Corporation	Semiconductors	LSI	7,800	31 1/4	– 11 1/4	sell
Macromedia Inc.	Multimedia sw	MACR	14,000	8 1/16	– 1 1/16	hold
Mattson Technology	Semiconductor equip.	MTSN	30,000	11 1/16	+ 1 1/16	sell
Octel Communications	Voice hw/sw	OCTL	5,800	22 1/4	+ 1 1/16	hold
Premisys Communications Inc.	Telecom equip.	PRMS	17,000	15 1/4	+ 1/4	hold
Sequana Therapeutics Inc.	Biotech	SQNA	10,000	11	– 1	sell
Standard & Poor's 100 Index		OEX	20	16 1/2	– 16 1/4	hold

New Holdings

Amazon.com	Online bookstore	AMZN	10,000	18 1/16		buy
Biochem Pharma	Pharmaceuticals	BCHXF	10,000	21 1/4		buy
Forte Software	Software	FRTE	15,000	12 1/4		buy
General Scanning Inc.	Laser technology	GSCN	10,000	14 1/4		buy

Cash Holding \$237,566.00

Portfolio Value \$1,956,502.72 (+ 95.65% overall) – 8.30%

Legend: This fund started with US\$1 million on December 1, 1994. We are trading on a monthly basis, so profits and losses will be reflected monthly, with profits reinvested in the fund or in new stocks.

TWITS is a model established by *Wired*, not an officially traded portfolio. Jeffery Wardell (jwardell@hamquist.com) is an executive financial services representative for Hambrecht & Quist LLC, who may have a personal interest in stocks listed in TWITS. The opinions expressed herein are those of the author and not necessarily those of H & Q's research department. H & Q has not verified the information contained in this article and does not make any representations to its accuracy and completeness. *Wired* readers who use this information for investment decisions do so at their own risk.

A Semi Selloff

It's time to sell Mattson Technology and Applied Materials; the semiconductor equipment business is cyclical, and soft DRAM prices have caused several chip fab projects to be postponed. It's also time to sell LSI Logic. Wall Street slashed the company's share price in half early last summer. We're picking up another chip-related stock – General Scanning. With no direct competitors, the laser company's revenues are on the rise, and the stock appears to be a great value at 10 times earnings.

The Diamond Multimedia and Sequana Therapeutics holdings have both disappointed. Biochem Pharma is a strong pick; the company makes one of the baseline AIDS treatments, and its partner is negotiating a deal to sell Biochem's hepatitis B drug in China. Forte Software is another good buy; the stock has been crushed in recent months, but it appears the company is also a possible target for a suitor. The last addition is Amazon.com – its business model and sales momentum should surprise the Street. Don't forget the Peter Lynch mantra: Love the product, buy the stock. – Jeffery Wardell



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Hype List

Deflating this month's overblown memes.

1

Smart Drugs

Just when it seemed smart drugs had gone the way of raves and brain machines, a new generation of supposed "cognitive enhancers" is being swallowed by the gullible. Perhaps it's Prozac's fault: it taught people with too much disposable income that brains are just a mix of neurotransmitters ready to be tuned to their needs. Or per-

haps it's a side effect of the resurgence of genetic determinism, which maintains that everything about us, from addictions to predilections, is chemically based. But intelligence has to depend on more than a steady intake of DHEA; otherwise *Mondo 2000* icons Durk and Sandy would replace Dr. Weil as Time Warner's favored hippies.

2

Wave Division Multiplexing

Forget about the battle between the Netheads and the Bellheads, the new war raging in the telecom arena is between Opticians and Electricians. As before, the disagreement is over technical esoterica about how the Net should be built. But this time, the very stuff the Net is made of sits at the center of the argument: whether to use conventional electronic devices to route and multi-

plex packets, or the next generation of all-optical splitters and wave-division multiplexers. You might think the electricians would win because optical networks are inflexible and still poorly understood. But you'd be forgetting the lesson of optic-vendor Ciena Corp.'s recent IPO blowout: the future belongs to those who promise it to Wall Street, no matter how far-fetched the proposition.

3

Zero Administration

For the longest time, the computer industry was able to ignore the plaintive sound of economists asking why computers show up everywhere except in productivity statistics. Fingers pointed at users; perhaps it was their one-handed reading of alt.sex or their excessive installation of flying-toaster screensavers. But after a couple of accounting studies showed that

— surprise! — computers require so much labor to maintain and support that it practically negates the help they provide, companies like Intel and Microsoft were forced to act. They wrote up a couple of white papers and invented a buzz phrase: zero administration. Now, if the Wintel duopoly gets its way, computers will once again become synonymous with productivity.

4

Cable Modems

Things were looking bad for the cable industry: careful study has shown that nearly the entire cable network would need to be replaced to make it suitable for two-way data traffic, and satellite services have been stealing away cable's television customers at an intolerable rate. Then, in June, Microsoft made a US\$1 billion investment in Comcast, the United States' fourth largest cable

TV company, and suddenly cable execs were flying first class again. But despite widespread industry optimism, Microsoft's money doesn't presage cable's victory in the Internet access wars. After all, Gates also has a stake in a satellite company and has been working with the telcos for years. All it really means is that more people will be subjected to MSNBC.

5

Augmented Reality

Overhyped technologies don't go away, they just come back with diminished expectations. Artificial intelligence, for example, gave way to artificial life, where instead of trying to make computers simulate humans, scientists struggled to make them simulate ants. Now virtual reality has returned in the form of augmented reality.

Instead of replacing reality with a 3-D mock-up, augmented reality superimposes computer graphics on top of real scenes to assist surgeons and house builders. The excesses of VR — the gothic bodysuits, Jaron Lanier's dreadlocks — are gone, but the conceit of geeks transcending the natural world with ray-traced polygons remains.

▲ = meme on the rise
▼ = meme in decline

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The Future of Home Videogames

You've heard the hype. We asked the experts. Here's the real timetable.

In 1972, the coolest kid on the block had the Magnavox Odyssey, the first home videogame console. To keep the price below US\$100, the Odyssey ran on 40 diodes and 40 transistors (microchips were too expensive) and relied on plastic TV-screen overlays for high-end graphics. Then came the

Atari 2600 and the birth of a revolution. Today, the Nintendo 64 is pushing the home-console envelope with beautiful 3-D graphics powered by a Silicon Graphics chipset. What can the next generation of screenagers expect? *Wired* asked several experts to play the prediction game.

	PCs Edge Out Consoles	First Profits from Online Gaming	Nintendo Drops the Ball	New Controller Replaces Joystick
Mayer	2005	1999	1997	2030
Rushkoff	2004	now	1997	2001
Svensson	unlikely	1998	2020	1999
Zinsmeister	2002	2000	unlikely	2005
Bottom Line	2004	1999	2009	2009

Andrew Mayer

freelance entertainment media designer who has worked with PF.Magic, Turner New Media, and Xulu Entertainment

Douglas Rushkoff

author of *Playing the Future* and *Ecstasy Club*

Christian Svensson

editor of Next Generation Online (www.next-generation.com/)

William Zinsmeister

senior research analyst specializing in videogames for IDC/Link Resources Corporation

Dive below the hype claiming that PCs tricked out with 3-D graphics boards are killing the home-console market, and you'll find that personal computers and consoles are keeping to their own turf – for now. "The disparity between playing on a TV in the living room and playing in the office or den at a desk is one factor that will always keep the two apart," Svensson says. But Rushkoff imagines the PC becoming a central server, putting Web access and gameplay in their appropriate places – on the desk and in the home's "entertainment room," respectively. "The videogame console will be overshadowed by the PC only when the PC becomes the router of all our home entertainment," he says. In any case, Mayer adds, "parents will happily shell out a little extra for a machine that does more than just play games."

The thrill of playing networked games against unseen human enemies across the Net – instead of zapping predictable, computer-generated foes – is expected to lure gamers into one of the fastest-growing online markets. But as companies build virtual playing fields, will they draw enough gamers? And, more important, will people pay to play? The first step to success, Zinsmeister says, is to come up with a profitability model for Internet entertainment. "Virtually no one is making money from online content," he says. However, Svensson believes that "with an hourly revenue model, very low overhead, and major partners (AOL, Earthlink, and CompuServe), Engage Games is likely to be the first online gaming service that turns a profit." Wait a minute, Rushkoff retorts: "Don't The Well and other feisty 'role-playing' forums count as online gaming?"

Sonic the Hedgehog was no match for Super Mario, but will Nintendo eventually lose its touch? "I thought they already had with the Virtual Boy," teases Svensson. But according to many game designers, Nintendo's loyalty to game cartridges may be the first nail in its coffin. "The lack of a CD-ROM drive, a tough production path for developers, and the fact that their DD64 recordable disk drive isn't being released until next year will make it tough for the N64 to beat out the Sony juggernaut," Mayer says. On the other hand, Zinsmeister notes that Nintendo's ability to walk the tech talk "recasts the company's outlook against naysayers who wrote it off in 1995 and 1996. N64 has tremendous upside potential, and its competition will be way off in the distance before mounting a serious threat."

Through more than two decades of home videogames, no controller has compared to the classic, and aptly named, joystick. Though the trackball, paddle, and joypad have had their moments, like body-tracking systems and control mats, they just can't take the twitch well enough. But soon, joystick-related ailments like *Space Invaders* wrist and videogame palsy could soon become a thing of the past. Svensson sees the future in force-feedback systems and 3-D controllers, similar to the Space Orb 360, for example, which is triggered by manipulating a sphere. Meanwhile, Rushkoff envisions two ergonomic, thumb-driven plungers flanked by rows of keys – "like two tiny trumpets. These," he says, "only half-jokingly," will be distributed for free as full settlement in the class-action suit against the entire industry for carpal tunnel and RSI injuries."

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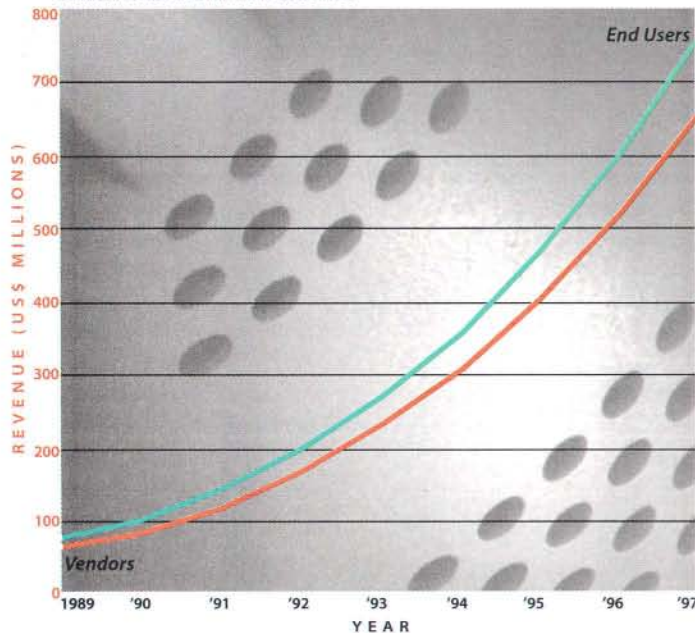
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Speech Recognition

Faster processors in low-cost computers and advances in programming techniques have made automatic speech recognition a US\$650 million industry; analysts expect revenue to reach \$1 billion by the end of 1998. By then, we could see ASR used in everything from air traffic control to rudimentary computer lip-reading, bringing us that much closer to a modern-day HAL.

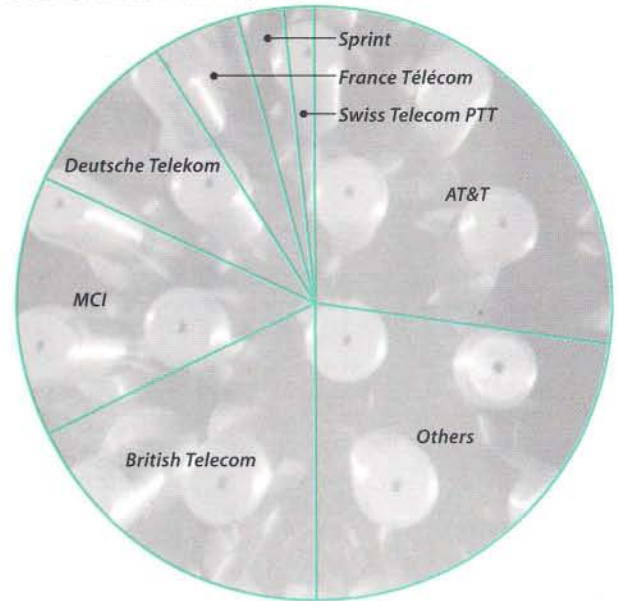
SOURCE: VOICE INFORMATION ASSOCIATES



Private Cable

Utility companies around the world are going private, including the firms that own undersea telecommunications cables. Until recently, most cables had been laid by state-owned carriers, then leased to private operators. Corporations, however, have foot the bill for some of the latest projects, notably transatlantic telephone cables TAT 12 and 13, completed in 1996.

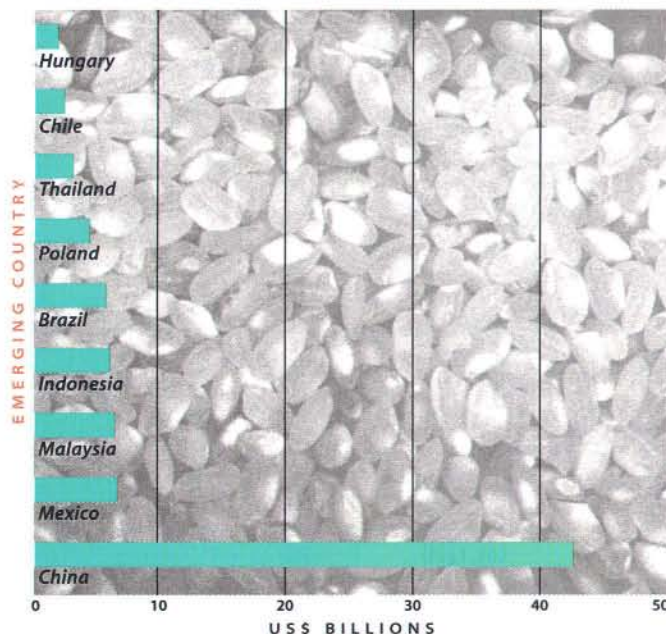
SOURCE: THE PETROLEUM ECONOMIST; TELEGEOGRAPHY INC.



Foreign Investment

While cross-border mergers and acquisitions attract foreign funds to the industrialized world, privatization and joint ventures have helped lure a flood of cash to less developed countries. Developing nations – with newly liberalized trade policies and free market reforms – collected one-third, almost US\$80 billion, of all foreign investment in 1996, with China leading the pack.

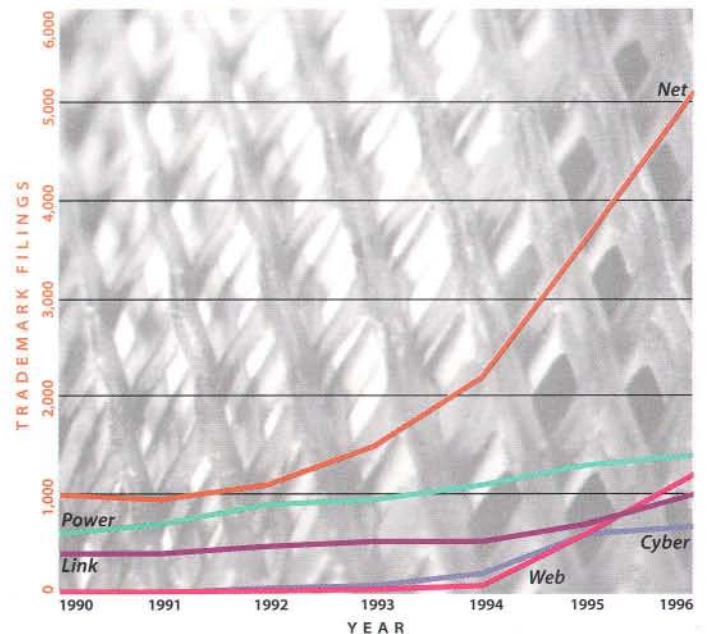
SOURCE: WORLD ECONOMIC FORUM GLOBAL COMPETITIVENESS REPORT 1997



Wired Words

Between 1994 and 1995, trademark applications for names containing *net* increased 75 percent. Of the 181,104 filings in 1996 – an all-time high – applications containing wired word-parts continued to show robust growth. The surge is expected to slow, however, since firms now must spend millions to differentiate themselves from the hundreds of other *net*-somethings out there.

SOURCE: MASTER-MCNEIL INC.



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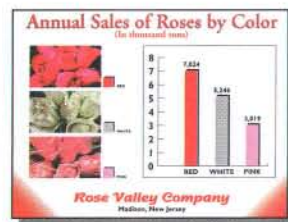
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The Next Big Thing Is HTML

Dynamic markup could finally kill the plug-in.

By Ed Anuff

By the time you read this, Netscape Navigator 4.0 and Microsoft Internet Explorer 4.0 will both be available as public betas. Shy away from this latest round of the browser wars, and

you'll miss out on perhaps the most important innovation in online publishing since the invention of the Web.

This milestone is not the browsers' much-touted push capability, but rather what both Microsoft and Netscape have dubbed Dynamic HTML. The new, expanded markup language adds features of the forthcoming HTML 4 specification while integrating scripting languages and a few browser-specific features.

The simple result of these improvements is the ability to treat a Web page's elements as objects that can be moved or resized before or after the page has been drawn.

A document-description format at heart, HTML has always been more concerned with content than appearance or layout. And while HTML can affect a document's display, its real purpose is simply to identify the content's structure.

From its inception, HTML was designed to be as device-independent as possible. One could make a convincing argument that this is not what Web users are looking for. The majority of online users surf on a fairly homogeneous set of computer platforms. Further, these users know multimedia through experience with carefully crafted CD-ROM designs and animations.

When multimedia finally arrived on the Web in the form of such plug-ins as Shockwave and Java, HTML's problems got worse. Because interaction between plug-in and browser is minimal, making Web pages

that mix text and graphics with multimedia elements is always tricky. The browser and the plug-in, essentially two separate programs, create a barrier that is difficult to cross.

DHTML takes a major step toward reversing this trend by bringing multimedia elements back into the fold, allowing authors to create multimedia-enhanced Web pages within HTML without losing access to the underlying content.

Its essential components are cascading style sheets and a scriptable document-object model, a way to link scripts, applets, and other code with a Web page's elements. Style sheets have arisen from the World Wide Web Consortium, while the two major browser vendors have driven scripting languages and the document-object model – although both Microsoft and Netscape, to their credit, have worked with the standards bodies.

Style sheets have been available for Internet Explorer since version 3.0, and they provide an elegant solution to most of the complaints leveled against HTML. They allow you to apply design and layout settings while retaining the document's HTML portability. Through the <STYLE> tag, you can control fonts and specify properties such as color, spacing, and alignment.

But while style information can be embedded within the document, more significantly, it can be linked to the document from an external file. The latter option is useful when many pages share the same styles. By placing the information in a single file, you ensure that any changes you make are used by all the pages employing that style sheet.

In addition, multiple cascading style sheets can be attached

to a document, which explains their name. For example, the document's author can attach a preferred style sheet that will best present the document, while the user may prefer to specify a different style sheet, perhaps for formatting the document on a small, handheld device like the Philips Velo 1.

The document-object model, then, is what brings everything together and allows an HTML page to behave like a CD-ROM. Every element on a given page – whether an image, paragraph, or link – is now an object with properties (such as font style, color, and position) and methods (for mouseclicks or other events). Scripts and applets can then be used to control the object's response to a user's action, as well as to determine a document's content, structure, and style.

A recent addition to cascading style sheets (CSS) is positioning, which, as the name implies, allows you to place page elements at absolute coordinates (200 pixels left, 100 pixels down) or to position them relative to other elements.

Consider both CSS positioning and the document-object model, and you can begin to see DHTML's potential. A JavaScript program, for example, could manipulate CSS positioning to change an image's placement, creating an animation – without a plug-in.

Beyond images, any HTML element – text, links, buttons – can be either wired up to scripts, so that you could execute a JavaScript program when an image is clicked on, or modified by other scripts, as when a script changes an image's position. Writing a program that allows you to click and drag an image anywhere on your Web page is

now a trivial task. Imagine, for example, dragging items on a shopping site into a graphical shopping basket.

At the moment, Microsoft and Netscape are implementing these features without much regard for compatibility. Many Web watchers are concerned that the two standards will not converge and that – in the process of rushing them through the standards bodies – the full implications of their usage may not be properly considered. They also fear that pages designed for these features will not “gracefully degrade” – won't be viewable on older browsers or more limited displays.

The Web Consortium's specifications provide guidelines to help page designers avoid this complication, but whether the Web gains rich multimedia at the expense of universal accessibility will ultimately depend on whether these artists take care in designing their pages and style sheets.

The payoff, however, is considerable. These capabilities bring a richer multimedia experience to the Web, and they may well be the essential step to making the Web live up to consumer expectations, as well as giving both content providers and online advertisers the capabilities they've been clamoring for.

In the past, many multimedia producers have expressed their concern that despite the tremendous advantages of online distribution, the Web's fast rise really derailed multimedia development. It looks like DHTML is finally putting things back on track. ■ ■ ■

Ed Anuff (ed@wired.com) is director of product management at Wired Digital, the company formerly known as HotWired.



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- "After Audit Angst or How to Look Yourself in the Mirror"
- Lunch provided (remember no deductions)

afternoon

- (Keynote speech) "Hold Your Head High"
- "Explaining the Short Form," a three act play by the Revenue Players
- Closing anthem: "Can You Feel the Love Tonight" led by the 1040 Singers
- Cocktail reception (don't even think about deducting this)

FROM THE DESK OF:
SCOTT HANSEN
Employee Benefits Director

***REMEMBER** attendance is mandatory. Please fill out Form 2375 in triplicate and remind to the Employee Benefits Section no later than August 15, 1997. If you need help filing the form, please file Form 830-H no later than August 1, 1997. There are substantial penalties for filing late.

One-to-One Publishing

Many too many choices?

For those praying in vain at the altar of new media, the organizers of Interactive Publishing Europe, held in Zürich, have this admonishment: There's successful multimedia, and then there's scatter media. Audio and video streams, 3-D chat, and intelligent agents all herald the coming-of-age of ubiquitous customized information, but they also hint at the hidden dangers of deploying technologies willy-nilly, rather than concentrating on the applications' applicability.

"It's very difficult to move from mass media to one-to-one publishing," says conference organizer Norbert Specker. "With customization and push technologies, this difficulty becomes more apparent. How can one product suddenly be many things to very different people and still expect to keep the same brand identity?"

The multimedia colloquium will examine a range of approaches to individualization – personalized news, online commerce, and city

guides, for example – to provide a complete picture of what it takes to succeed online.

Focusing the conference keynotes on content, Specker has commissioned interactive publishing royalty such as EDventure Holdings's Esther Dyson and Ziff-Davis's J. B. Holston III. Another promising talk, "Now & Everything," features *The Arizona Daily Star's* director of new technology, Robert Cauthorn, who will explain how a humble

local newspaper entered into businesses as varied and risky as Web news, Internet access, and game development.

Specker sums up Cauthorn's surprising success story as "the cowboy approach to turning dominance in the local marketplace into future-oriented Net businesses."

Like the sound of cowboy media? Head to Zürich to round up a model and metaphor to match your medium and message.

Registration: SwF2,750 (approximately US\$1,937). Contact: +41 (1) 387 7088, email ursula@interactivepublishing.ch, on the Web at www.catchup.ch/IP/IP97/ip97.htm.



The Current Roundup (see *Wired* 5.08)

September 23-26 New Computer Security Paradigms Workshop '97; Great Langdale, England. • **September 24-27** TED/Technotainment; New York. • **October 2-6** SMAU '97; Milan. • **October 11-13** Mixed Messages: Images, Text, and Technology; Charlotte, North Carolina. • **October 12-16** IEEE International Conference on Universal Personal Communications; San Diego, California. • **October 13-14** International Symposium on Wearable Computers; Cambridge, Massachusetts.

October 22-24 **Avatars '97; San Francisco** If some of your closest friends are avatars, don't miss this Contact Consortium-sponsored artificial-world extravaganza. Check out the virtual landscape circa 1997 in the "beam-in teleport" room, where you can tour a variety of 3-D domains. Learn how to turn a profit in the avatar business. And discover new commercial applications such as virtual workspaces. Registration: US\$349. Contact: +1 (408) 338 9400, email avatars@cccon.org.

October 23-25 **Images of Politics: History and Development of Political Communication on Television; Amsterdam** How do mass media alter popular notions of government? Does TV turn politics into a bloodsport? With sessions on political marketing, the Americanization of news, and the emergence of a worldwide electronic democracy, this confab offers an international examination of political communications. Registration: Dfl250 (approximately US\$132) through September 1, Dfl300 (US\$159) after. Contact: +31 (20) 665 2966, email monique.vandongen@sfw.nl.

November 3-8 **Globecom '97; Phoenix, Arizona** The IEEE-sponsored Global Communications Conference offers the latest research into communications and networking technologies. From ATM, Internet telephony, and intelligent networks to satellite communications and wireless to wireline integration, this geekathon will lay bare the future of voice and data infrastructure. Registration: US\$550 through September 20, \$625 after. Contact: +1 (602) 581 4297, email globecom97@agcs.com.

November 6-8 **The Politics of Access to Computer-Assisted Education; Chicago** Sponsored by the Modern Language Association, this event addresses questions raised by the push to wire schools: Which students will have access to computers? And how does access, or the lack thereof, affect the educational impact of learning technologies? Registration: restricted to MLA members. Contact: +1 (319) 335 0331, email nickevans@mail.utexas.edu.

November 8-14 **ACM Multimedia '97; Seattle** We are moving into an era of multimodal computing whose ultimate shape and feel is yet unknown, proclaim organizers of this GUI gala. From document models and authoring tools, to scalable and translucent interfaces, to interactive audio documents, attendees will

OCTOBER 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 NOVEMBER 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Particles on the Run

What good would a trip to Switzerland be without a drive on the autobahn? Why not try a high-gear journey from Zürich to Geneva, where you can see the high-speed particle accelerators at CERN?

One of the largest science labs in the world, the Conseil Européen pour la Recherche Nucléaire – aka the European Laboratory for Particle Physics –

welcomes visitors Monday through Saturday. There, observe CosmoLep, which seeks out atmospheric muons in cosmic rays. Visit the Large Electron Positron collider – at 26.7 kilometers in circumference, it's the planet's largest scientific instrument. Or explore the *Microcosm* exhibition – its subatomic enticements include a demonstration of the

conditions that followed the big bang and a preview of a next-generation accelerator component called the Large Hadron Collider.

If accelerating an automobile through the Alps isn't your cup of fondue, take the train. Of course, it really doesn't matter how you get there: CERN's scientific wonders will reward your efforts.

double-click through the desktops of today to open the computing environments of tomorrow. Registration: price unavailable. Contact: +1 (518) 276 2657, email citrin@cs.colorado.edu.

November 12-14 **Interactive Publishing Europe; Zürich** See information at left.

Out on the Range

November 17-19 Computer Security Conference & Exhibition; Washington, DC. Contact: email prapalus@mfi.com. • **November 20-21** Online Games '97; Los Angeles. Contact: email jupiter@jup.com. • **December 3-5** New Models for New Media; Reno, Nevada. Contact: +1 (573) 882 1110.

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Crash Test

Israel's transportation ministry, spurred by the skyrocketing death toll on the highways, outlawed the use of cell phones in cars not equipped with the legally prescribed dashboard microphone. But why stop there? When David Cronenberg's latest film, *Crash*, (see *Wired* 5.05, page 184) first opened in the Jewish state, Israeli transportation minister Yitzhak Levy petitioned to outlaw the movie. It wasn't the film's graphic sex he objected to, but the fact that Israeli drivers might wish to emulate its driving. The Israeli High Court of Justice refused to bar the premiere. It probably understood that much of Cronenberg's cracked opus was already old hat for Israel's murderously aggressive drivers. So far this year, more than 200 people have died on the roads in Israel compared with the mere half-dozen or so deaths in *Crash*. Drive safely.

Rocket Jockeys

Since our article on the nascent amateur space race appeared three years ago (see *Wired* 2.11, page 68), rocket buffs across the country have set their sights on the stars, and one group has come out on top. On May 11 – Mother's Day – more than a dozen amateur rocket builders from the Huntsville, Alabama, L5 Society (HAL5) shivered in the cold pre-dawn near the North Carolina coast, as they laid out lines, stabilized fuel temperatures, and readied themselves for a launch that would land them in the record books.

Standing just 7 feet high, HAL5's *HALO Space Launch 1* rocket was fashioned in a member's garage from surplus military materials and fire extinguisher casings. This kept costs low: while NASA spends more than US\$500 million to put the space shuttle into orbit, HAL5 members knocked on the door to the cosmos with a rocket built for a scant \$8,000. The group's "rockoon" is powered by a high-altitude helium balloon that carries the rocket through the densest parts of the atmosphere until the engine is ignited on the final leg.

As *Space Launch 1* floated skyward gaining about 600 feet per minute, a small camera affixed to the balloon's gondola transmitted live color video images to the ground crew back on earth. But at 60,000 feet and almost 90 minutes after launch, a balloon seam suddenly gave out. The ground crew then ignited the rocket's hybrid fuel, concocted from a combustible mixture of nitrous oxide (laughing gas) and ordinary asphalt, which thrust the craft toward space. One-and-a-half minutes later, 36 nautical miles (about 218,000 feet) over the Atlantic Ocean, the rocket petered out, just 14 nautical miles shy of the US-defined space border. But it was the highest amateur launch so far, more than doubling the previous record for an amateur rocket set by



a group from Vermont earlier this year.

The rockoon recently caught the attention of NASA, which will provide \$15,000 for HAL5's next launch sometime this fall. Vance Houston, NASA's project manager for High Altitude Launch Systems, says the agency supports amateur efforts, seeing them as a way to excite young people about space. But Houston remains skeptical: "This will provide access to space but will not enable people to orbit a payload or satellite around Earth." A useful payload would weigh 100 pounds or more, which no amateur rocket will ever carry, says Houston. Nevertheless, HAL5 member Ron Lajoie thinks it could happen in his lifetime. With the support of NASA, the group plans to launch a rockoon with a 7-pound payload this fall.

Amateur rocketeers put in long hours (HAL5 members spent three years designing, building, and testing *Space Launch 1*), and many are motivated by the desire to someday live in space. The Huntsville group is a chapter of the National Space Society, whose 25,000 members worldwide advocate "creating a space-faring civilization." Greg Allison, HAL5's program manager, feels limited by our terrestrial grounding and says we must leave this planet to ensure our survival. Lajoie envisions a space tourism industry, perhaps offering honeymoon cruises between the Earth and the moon. "I grew up on *Lost in Space*, *Star Trek*, and Apollo missions. I'm an explorer at heart, and I want to go to space," Lajoie says. Amateurs say traditional space programs put satellites in orbit and conduct scientific experiments but often leave out the public. "This is about providing cheap access to space for students, amateurs, or anyone," explains Lajoie. "Our program is a baby step toward that." – *Jim Rendon*



Ion Storm Rising

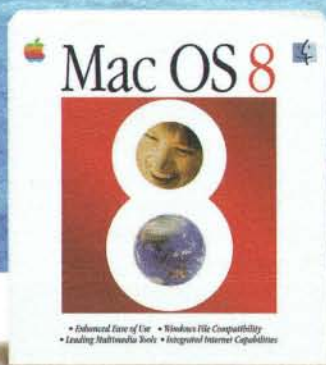
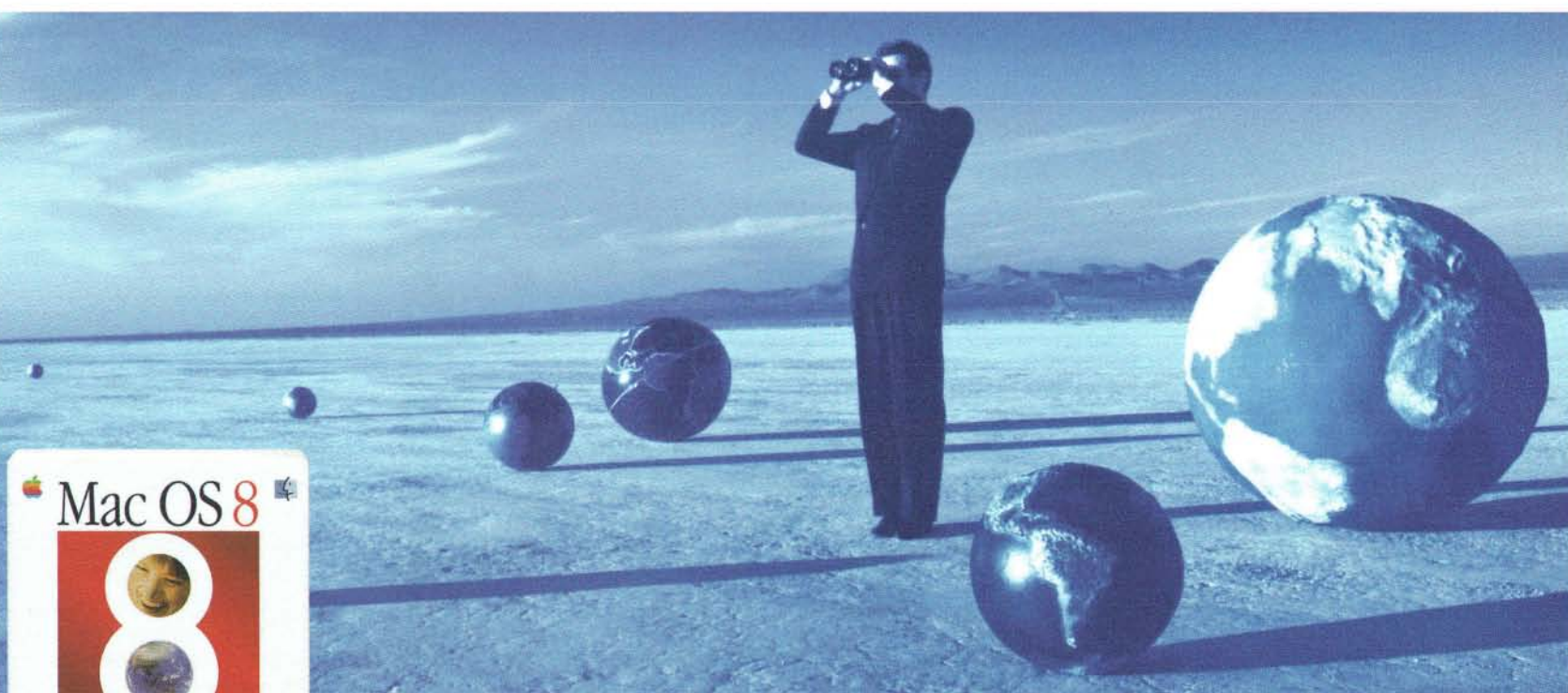
When we last spoke to *Doom* designer John Romero in *Wired* 4.08, he'd just put the finishing touches on id Software's latest creation, *Quake*, then promptly left the company with plans to start his own gaming venture, Ion Storm. Since then, Romero has leased

the top two floors of the Texas Commerce Center in Dallas, partnered with Tom Hall (id cofounder and former designer/producer at 3D Realms) and Todd Porter (a former vice president at 3D Gaming). Ion's key heuristic: "Design is law," says Romero. "That's what makes games successful."

But can Romero's team compete in this saturated market? Its first release comes this November with *Daikatana*, in which a player travels through time trying to rewrite history. And Romero, the man who helped invent the virtual splatterfest, is sure this is the first of many successful Ion titles.

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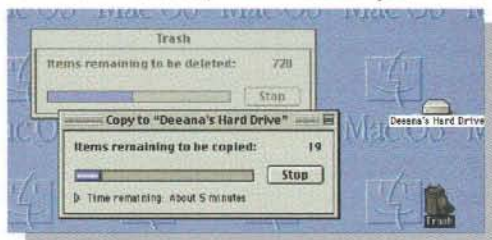
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What a difference 8 makes.

Free Speech 1, Censorship 0

Looking beyond the CDA victory.

By Mike Godwin

For once, Bill Clinton got it right the first time.

On June 26, the Supreme Court handed down its 9-0 ruling in the case of *Reno v. ACLU*, declaring the Communications Decency Act unconstitutional. Responding to the Court's decision, President Clinton issued a press release that implicitly acknowledged the key impact of the decision: any future attempt to craft "son of CDA" legislation is also likely to violate the First Amendment.

"The administration remains firmly committed to the provisions – both in the CDA and elsewhere in the criminal code – that prohibit the transmission of obscenity over the Internet and via other media," Clinton said. "Similarly, we remain committed to vigorous enforcement of federal prohibitions against transmission of child pornography over the Internet, and another prohibition that makes criminal the use of the Internet by pedophiles to entice children to engage in sexual activity."

Of course, the victors in *Reno v. ACLU* never challenged the provisions of the CDA that banned obscenity. And despite its supporters' claims, the act never addressed child pornography or pedophiles. Instead, it was aimed at "indecent" material, which isn't necessarily pornographic and which may not even be about sex at all.

The president overlooked this, but his statement was probably the closest thing we'll ever get to an admission that he was wrong – *totally wrong* – in supporting the CDA as a constitutional way to protect children from inappropriate material on the Internet.

Still, the president didn't call for new anticyberporn legisla-

tion. Instead, some clueful soul at the White House must have convinced him that the Court's ruling is so broad that *any* legislation even remotely similar to the CDA will most likely be struck down as well. As Jonah Seiger of the Center for Democracy and Technology puts it, "Not only did the Court strike down the specific language of the CDA – it closed the door on future efforts to impose broadcast-style content regulations on the Internet."

Instead of calling for new legislation, President Clinton asked industry leaders and concerned citizens to help develop ways to protect children on the Internet, with a focus on technical

Lofgren (D-California) and Ed Markey (D-Massachusetts) separately called for laws that would require ISPs to provide blocking software to subscribers – each a sort of Full Employment Act for the Net nannies of the software industry.

To be fair, these legislators were probably stuck in damage-control mode. Most of them had assumed the Court would strike down the CDA, but they believed that the decision would be based on narrower reasoning, leaving open the door to constitutional – but otherwise CDA-like – legislative measures down the line.

What they didn't count on, perhaps, was *Reno v. ACLU* arriv-

None of this means that the war on Internet free speech is over. Even today, the Internet is so routinely (if reflexively) demonized by legislators and the media that opportunistic politicians will continue to use it as their bogeyman.

In the coming rounds, the fight for free speech and the fight for privacy will be closely intertwined. This fall, look for the Net to be characterized as a hotbed of kiddie porn and terrorism as the White House teams up with legislators such as John McCain (R-Arizona) and Bob Kerrey (D-Nebraska) to boost support for an antidemocratic cryptography agenda that promotes mandatory key escrow systems.

Look also for antiporn activists from the religious right to use Justice Stevens' majority opinion, which emphasized the "absence of evidence" supporting the need for a government clampdown on cybersmut, as an excuse for another pseudoscientific study of porn on the Net.

In the long term, though, the impact of *Reno v. ACLU* is likely to remain undiminished. As former FCC counsel Bob Corn-Revere summarized it, "This is a landmark decision of at least the magnitude of *Near v. Minnesota* (which held that states cannot impose prior restraint on newspapers) and *New York Times v. Sullivan* (which put First Amendment limits on libel law)." Justice Stevens' decision, Corn-Revere said, "is not the end of history on these matters – the Family Research Council has already been quoted about going back to Congress. But it leaves very little room for them to maneuver." ■ ■ ■

Mike Godwin (mnemonic@eff.org) is staff counsel for the Electronic Frontier Foundation.

Apathy



Action



THE SUPREME COURT'S historic decision in *Reno v. ACLU* is a foundation for free speech in the 21st century. Read what the justices had to say at www.cdec.org/SC_appeal/decision.shtml.

THE WHITE HOUSE now supports market-driven proposals that rely on ratings systems and filtering technologies. The new policy is spelled out in the administration's Framework for Global Electronic Commerce at www.iitf.nist.gov/elecomm/ecom.htm.

SENATOR PATTY MURRAY (D-Washington) is the first contestant in the "son of CDA" sweepstakes, having proposed the Childsafe Internet Act of 1997. You can visit her site at www.senate.gov/~murray/, and let her know what you think of the bill by calling +1 (202) 224 2621.

solutions that give parents and teachers the ability to limit access to online material that kids shouldn't see. It's a nice idea – too bad he didn't think of that back in 1995.

Meanwhile, over on Capitol Hill, not everyone was as quick on the uptake. Senator Patty Murray (D-Washington), for example, released a statement promoting a sweeping new bill, the Childsafe Internet Act of 1997, which includes provisions to build mandatory parental-warning messages into every Web browser, incentives to rate content, and criminal penalties for misrating a site. In the House, Representatives Zoe

ing in the form of a 9-0 decision to strike the CDA down, and a 7-2 decision that no CDA-like legislation could be constitutional. In effect, the decision grants Internet speech *at least* the same amount of First Amendment protection that the Court has long granted to print entities like *The Washington Post* and Barnes & Noble. And that, in turn, means any government scheme that involves mandatory labeling and filtering is likely to be regarded as an unconstitutional form of "compelled speech" of the sort you could never impose in the print-media world of newspapers, books, and magazines.

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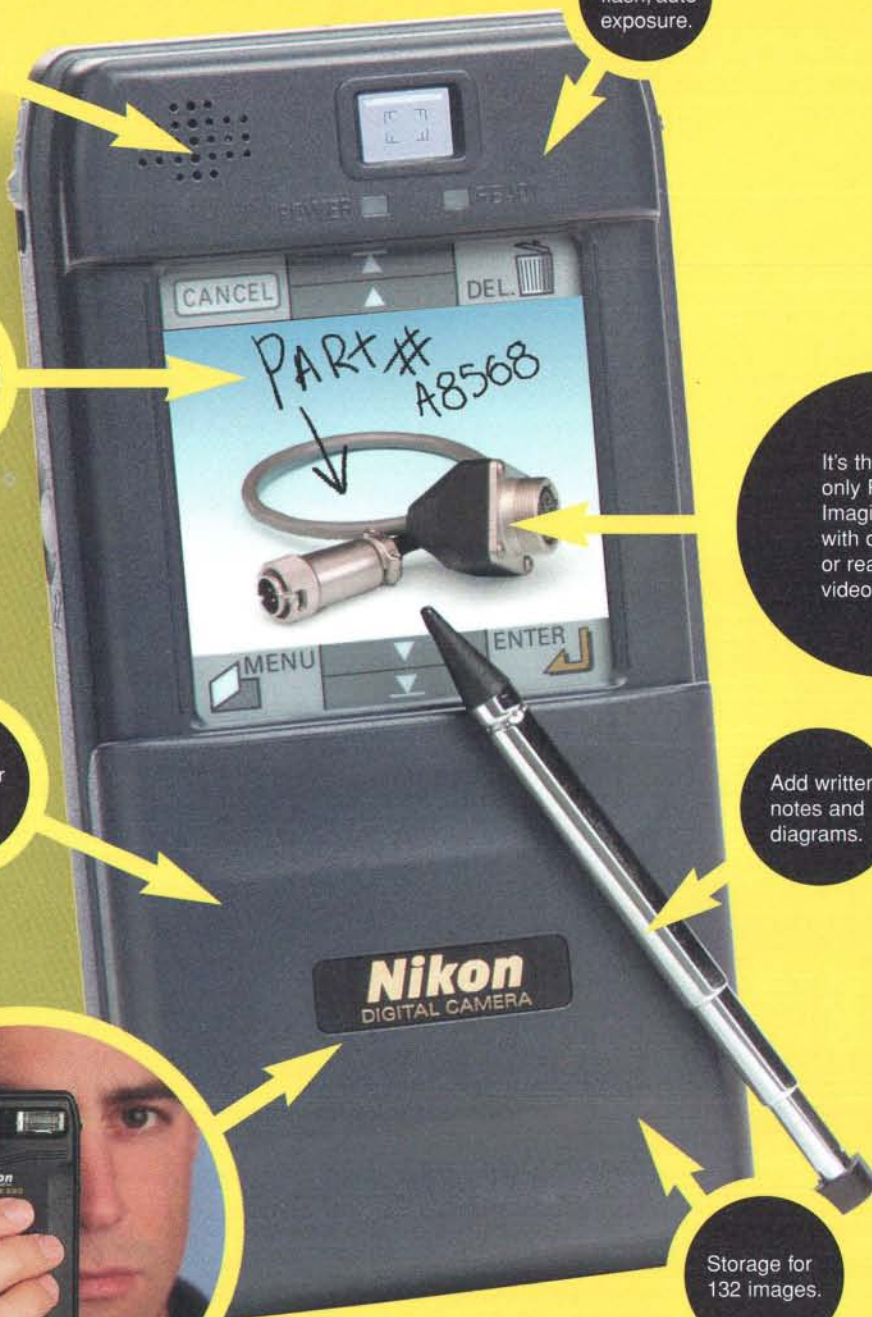
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"Please Quote Me on That"

How Forrester Research and Jupiter Communications vie for ink.

By Scott Kirsner

www.wired.com/5.09/research/

By the time you've finished reading this article, Bill Bluestein, Mary Modahl, and Stuart Woodring will be a little bit richer.

That's because they work for Forrester Research, a Cambridge, Massachusetts, technology research group that compensates its analysts in part based on how

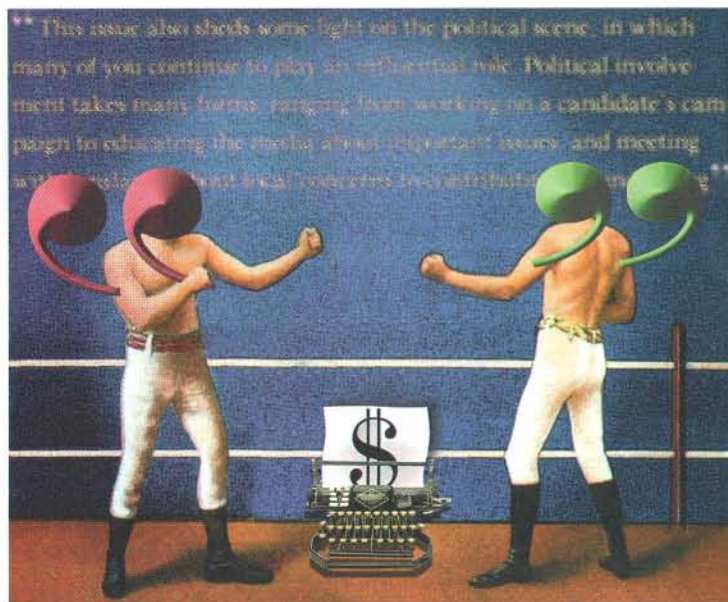
often they get quoted.

Forrester wants to establish itself as the preeminent prognosticator of how people will interact with all things electronic, and its unusual marketing ploy seems to be working. If you've been reading *The New York Times* for the past year, you've seen a Forrester analyst cited an average of 3.5 times a month, spouting off about

says Forrester president George F. Colony, a charismatic 44-year-old who founded the company in 1983. "Quotes help us sell."

No one understands that better than Adam Schoenfeld, a VP at Jupiter Communications in Manhattan. The scrappy, fast-growing Jupiter is Forrester's closest competitor in the consumer research market, with a projected \$10 million in annual revenue, and Schoenfeld is Jupiter's one-man quote-spewing jihad. He averages 1.25 mentions a month in the *Times*—more than any one of the competition's pundits. "I keep my eye on a couple of my favorite Forrester analysts," the 33-year-old Schoenfeld acknowledges with a grin, "just to make sure I'm getting quoted more than them." Schoenfeld, who worked for the Associated Press before coming to Jupiter, is constantly consulted by writers doing pieces on the latest wrinkle in the online services business. "If we were paid by the quote," he says, referring to Forrester's practice, which is unique in the industry, "I suspect I'd be the richest man in cyberspace."

While Schoenfeld's visibility exceeds that of any single Forrester analyst, Jupiter as a company trails its competitor in overall media mentions. In one week this spring, when Microsoft had just announced its purchase of WebTV Networks and America Online was reportedly mulling an offer for CompuServe, references to Forrester Research showed up 49 times in a broad index of 3,600 publications, while Jupiter popped up 34 times. During the same seven-day period in April, however, Jupiter scored quotes in some very high-profile places: two were in the *Times*, and two were in *The Washington Post*. By comparison, Forrester had just two citations in major newspapers.

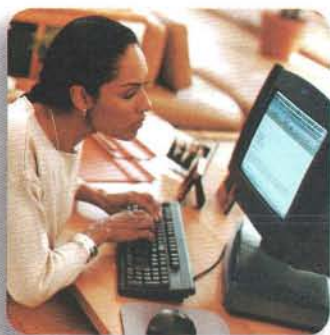


The heated contest to sell consumer research is fought every day in the *Times* and the *Journal*, as well as *Forbes*, *Fortune*, and *Time*. And industry heavyweight Forrester faces stiff competition from the scrappy, fast-growing Jupiter.

Web site security or commenting on consumers' willingness to pay for content. If you're a *Wall Street Journal* reader, Forrester references pop up even more frequently: 7.75 times a month.

What's driving Forrester's aggressive publicity push? The company, with a projected annual revenue of US\$34 million, hopes to dominate one very hot arena: selling accurate forecasts of how consumers will use new technologies to companies like Disney, Netscape, and Federal Express—along with, coincidentally enough, The New York Times Company and Dow Jones & Company, which owns *The Wall Street Journal*. "A very critical way we market is through the media,"

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It's tough to rankle Forrester's founder by pointing out that the young Turks on Broadway rival his larger, older firm for visibility. Colony, a native of New Hampshire, asserts that being located in the media capital of the world accounts for a lot of Jupiter's ink. "Being in New York helps get you on CNN," he says. "It gets you on *Charlie Rose*. You drink with the new reporter at ABC." Colony adds that several of Jupiter's key players come from journalism backgrounds, which gives them even more of an edge.

Gene DeRose, who did a short stint at *Cosmopolitan* before joining Jupiter in 1990, couldn't agree more. "We're the New York media and consumer marketing shop," says Jupiter's chair and CEO, sitting in his office alongside an acoustic guitar and a concert poster from The Knitting Factory, a nearby avant-garde nightclub. "We're smart and engaging about what we do," DeRose continues, explaining Jupiter's stellar visibility with a splash of the cockiness that's endemic to his industry. "We make good copy."

**"I keep my eye on a couple of my favorite Forrester analysts,"
a VP of Jupiter says with a grin,
"just to make sure I'm getting quoted more than them."**

Not to mention that he grew up with (and used to employ) one of the producers of CNNfn's daily *Digital Jam* - which may help explain DeRose's regular appearances on the show.

The other side of the publicity equation, of course, is that journalists need experts to add a credible "industry observer" voice to their stories. Usually, there's a tight deadline involved, and the analyst who returns the call first gets ink. Sean Wolfe, an online editor at Cowles New Media, gives Forrester high marks: "They turned calls around on a dime, and they gave you really good quotes."

"You can tell by the tone of the journalist's voice how close they are to deadline," says Matt Cain, a former managing editor at *MIS Week* and reporter for *Electronic News* who's now a VP at Stamford, Connecticut-based

Meta Group, another market researcher. "Give 'em the quote and get off the phone," he advises his analysts. Cain adds that one of the services analysts perform for journalists is explaining how complicated technologies work and putting vendors' oft-inflated claims in perspective. The journalists "wind up looking smarter than they actually are," Cain says, "because you've given them the big picture."

Forrester, Jupiter, and competitors like the Meta Group typically send out large flights of press releases to promote their latest research findings or media events. Jupiter ships about one a week; Forrester's average is closer to two. But Steve Lohr, a *New York Times* reporter who covers the technology beat, says he ignores most of the self-promotional mailings - he contacts the market researchers only when he needs a comment for a story he's working on. "Everybody deals with these people in a mercenary fashion," he says. Like *Times* colleague John Markoff, Lohr says he consults analysts for quotes to

help shape a story, not when the analysts' firms are pushing a new report or service.

Markoff, the *Times*'s most prominent technology writer and the coauthor of *Take-down: The Pursuit and Capture of Kevin Mitnick*, says analysts have to prove their astuteness about tech trends to remain valuable as a source. "There are people I won't name that I won't go back to as sources because they turned out not to be knowledgeable," Markoff says. Does he worry about the ethics of using as sources analysts who are getting paid, in part, for making it into his stories? "Not really. I make up my mind about the usefulness of an analyst based on a number of conversations I have with them. If I feel like they're clueful, as opposed to clueless, I'll use them. It's a judgment call on my part."

A *Wall Street Journal* reporter, who requested anonymity, points out that those in his profession need to be careful about quoting one research firm in too many stories, giving the appearance of favoritism. "There's a bias against using any one in particular too much," he says. This same reporter, though, referred to Forrester analysts or reports in 20 stories last year. By comparison, his articles contained just one mention of Jupiter Communications all year, and less than three mentions each for some of the other major research firms: Meta Group, Gartner Group, Yankee Group, and Giga Information Systems. George Colony's marketing plan, in this light, looks pretty savvy.

In the past, companies like Forrester, Gartner Group, and International Data Corporation concentrated solely on helping technology vendors understand how to sell to corporate markets, or, conversely, helping corporations understand what technology they needed to buy. Since research firms were so intently focused on the needs of big business, many missed the emergence of the consumer market for the personal computer in the '80s. Once PCs had won a place in the home, few of the research firms predicted the rise of services like CompuServe and America Online, and even fewer called the emergence of the Internet as a network for consumers. George Colony recalls that whenever he came across the word "Internet" in a draft of a Forrester report, he'd cross it out. "This is academic garbage," he'd scrawl.

"I was mad as jumping beans at George in that area," recalls Forrester's Mary Modahl, who helped jump-start the company's research into consumer use of online services, interactive television, and the Net. By 1994, Modahl had created Forrester's first "new media" service, dubbed People & Technology. The company's initial take on the Average Joe's adoption of technology has proven clear-eyed: Forrester predicted that interactive TV would tank and that the Web would eventually surpass proprietary online services in usage.

Jupiter, founded in 1986 by Josh Harris, prides itself on having hit the field before its

Beefeater Imported Gin, 47% Alc. by Vol., Hiram Walker & Sons, Inc., Southfield, MI



A black and white photograph of a bottle of Beefeater London Distilled Dry Gin. The bottle is partially filled and has a red wax seal on the neck. Next to the bottle is a martini glass filled with a clear liquid and three olives. The background is dark and textured.

competitors. "From Jupiter's beginning it was always about consumer online services," says Harris, who serves on the company's board but is no longer involved day to day. "We stuck to our guns and just ground it out, waiting for the market to catch up." While the market was catching up, Jupiter focused on videotex systems, screenphones, and other telecom-related information services.

"In the late '80s," DeRose explains, "no one was spending more money looking at consumer interactivity than the phone companies. And in this business, you follow the money." As other companies – cable TV providers, broadcasters, publishers, and advertisers – slowly began to demonstrate more interest in how consumers used the electronic media, Jupiter's growth followed apace, expanding from 12 people in 1990, to 35 in 1994, to 85 in the spring of this year and a projected 100-plus by year's end. "This is going to be a big space," DeRose says of consumer interactivity. "We have to gain size, scale, and brand equity quickly."

To date, Jupiter has grown organically, without infusions of capital from outside sources, though the business has reportedly entertained recent offers from both Gartner Group and Meta Group, two publicly held companies looking to build an expertise in the area of consumer interactivity. Harris

just punched through a 4-foot brick wall to take over 8,000 more square feet of space in a building next door. In May, Forrester expanded onto a third floor of its sleek office building midway between Harvard Square and MIT. "We're eating floor by floor," says Colony, who has an option on the entire place. The company now employs 190 people, 80 of whom are directly involved in research.

Both workplaces, populated with the jeans-and-Doc Martens set, exude a sense of late-'90s casual purposefulness. On a recent visit to Jupiter, the lone white-haired employee was studiously wearing a bright white pair of sneakers. At Forrester, employees clad in the official green fleece company pullover greet the founder with a chipper, "Hey, George, how's it going?" Conference rooms at Forrester are named after the banjo-playing Colony's favorite band, The Allman Brothers. At Jupiter, it's more like Nine Inch Nails; employees there seem, on average, about five years younger than their Forrester counterparts.

Forrester and Jupiter adhere to similar economic models – they're essentially high-end publishers that seek annual subscriptions from big corporations. Wall Street analysts applaud the stability of this approach, since at the beginning of any given year,

Jupiter occupies the lower end of the scale, selling \$500-a-year subscriptions to newsletters like *Digital Kids Report* and \$1,000-a-head passes to conferences such as "@travel: Strategies for Destination-Based Commerce." Forrester, which went public last year, has positioned itself on the big-ticket side of the consumer research market. The lowest possible subscription price for one of Forrester's research services is \$5,000 with a minimum of three services required, and the average company shells out \$15,200 annually for "core research." If you want to be able to pepper a Forrester researcher with questions, though, or schedule meetings to review your Web strategy, you're talking an average of \$85,000 a year for the firm's prestigious Partners Program.

Naturally, the ambitious young execs at Jupiter covet figures like that. A year ago, the company began an experiment to try to boost cash flow and to build stronger client relationships: bundling its deliverables into a package called Strategic Planning Services, or SPS. By putting a single price tag on a bundle of newsletters, reports, and conferences and granting clients access to Jupiter's analysts, the firm discovered it could charge \$15,000 to \$40,000 annually. DeRose, who calls SPS the "key focus" of his company right now, says he has signed more than 100 clients to the package deal so far and believes he will end the year with well over 200 clients.

But despite Jupiter's ability to match Forrester quote-for-quote at only half the size, clients see Jupiter as more of a tactical, numbers-oriented research group. "Jupiter takes a snapshot in time, with all the appropriate statistics," says an America Online manager in charge of buying research. Yet even companies like America Online that spring for SPS are less likely to take advantage of the analyst access that's included, viewing the service as essentially a "value pack" of reports, newsletters, and admissions to pricey conferences. Until Jupiter can prove the value of its personalized analyst insight, it will have a tough time matching Forrester's lofty per-client averages.

Competitors are only too happy to take swipes at Forrester.

"This isn't going to be another Forrester blowjob, is it?" asks Yankee's Howard Anderson.

and DeRose say an IPO isn't out of the question, once the market improves and Jupiter has established more of a track record.

In the meantime, both Forrester and Jupiter are growing like magic beanstalks. Forrester saw its sales jump 72 percent last year; the company now has five consumer-oriented new-media services – focusing on issues such as electronic commerce, Web publishing, and Internet advertising – up from zero in 1993. Jupiter lays claim to triple-digit growth since 1991 and has

Forrester and Jupiter have already booked a significant amount of guaranteed revenue through renewals (both firms retain more than 75 percent of their clients from one year to the next). The companies supplement their publishing revenue with other services – Jupiter hosts a series of new-media conferences, for example, and Forrester sells consulting time to about a third of its customers.

While the models are similar, one element that differentiates the firms is pricing.



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Forrester, in contrast, is regarded as a source of big ideas and long-term overviews. "We're ripping these executives open, thrusting some vision in there, and sewing them back up," Colony says, accompanying his words with animated gestures. Only a third of the contracts his company sells include face-to-face time with Forrester analysts, but clients that pay up are inclined to take advantage of the meeting time. Digital Equipment Corporation, for example, schedules frequent strategy reviews with Forrester analysts. Digital, which remains a Forrester client despite being bashed unremittingly in the press by Colony throughout the '80s, groups the research it buys into three tiers, based on perceived value and how much time employees spend with the analysts. Forrester is in the top tier.

As Jupiter strives to both change the perception that it is somehow less strategic than its Cambridge counterpart and at the same time roll in greater revenue, publicity becomes crucial. That's where the quotation derby comes in.

"The more you get quoted, the more people are likely to think you're important," says Laura Lederman, who follows market research stocks for William Blair & Company. "The more they think you're important, the more they're likely to buy from you."

Forrester's founder acts like the Great and Powerful Oz, post-curtain pulling, when questioned on his company's cash-for-quotes policy. He seems concerned that it might reflect badly on Forrester's deeply ingrained dedication to the research, and points out that there are greater financial incentives attached to writing good reports than maintaining a high profile in the press. Director Stuart Woodring, however, explains how the system works without a trace of reticence, and defends it steadfastly.

"One of our goals is to have a strong influence on technology markets," Woodring says. "And you can't have influence if you're not visible." According to Woodring, Forrester sets quarterly goals for each of its analysts, based on the current level of media interest in each area of expertise.

For example, an analyst covering Internet advertising might get 15 to 20 calls from reporters a week, and thus would have a higher goal than someone covering database technologies.

Each quarter, Forrester's marketing department tallies up media mentions, scanning about 100 general business publications. The list includes major newspapers like the *Times* and the *Journal*, as well as magazines such as *Forbes*, *Fortune*, *Time*, and even *Wired*. But Forrester analysts don't get points for every citation; comments that show up in technology trade publications like *PC Week* or *InfoWorld* don't count toward an analyst's goals. According to Woodring, getting placement in the trades is too easy. "We could be in trade publications 10 times an issue," he says.

Similarly, Forrester could also earn scads of mentions in smaller-circulation magazines and newspapers, but the com-

reporter gets them. "It's really easy," says Forrester's Bill Bluestein, "but I don't think a lot of firms are thinking about it."

Jupiter isn't, at least consciously. While Schoenfeld and DeRose rely on their experience as members of the Fourth Estate to guide them in generating publication-ready quips, there's no formal media training for the analysts, and the company neither tracks how often it's cited in the press nor compensates analysts on that basis, though DeRose admits to doing an occasional Nexis search "for fun." DeRose is strident, however, in his opposition to Forrester's cash-for-quotes policy: "The idea that analysts should be out there whoring themselves to the press sets a bad precedent. You begin to damage the objective underpinnings of the firm."

Other competitors are only too happy to take similar swipes at Forrester, while tacitly acknowledging the effectiveness of its marketing crusade. Interviewed for this

"One of our goals is to have a strong influence on technology markets," says Forrester's Stuart Woodring. "And you can't have influence if you're not visible."

pany takes steps to conserve its time and energy. Earlier this year, the outgoing phone message in Forrester's marketing department stated, "If you're a member of the press and your publication has a circulation greater than 30,000, please leave a message. If your circulation is less than 30,000, please understand that the volume of requests that we receive may prevent us from returning your call." Forrester later changed the message after receiving complaints from smaller publications.

Still, Forrester subjects its new hires to a crash course in media relations. Some of the lessons: comment on technologies and companies, but never on individuals; rid your speech of qualifying modifiers, which make you sound uncertain; speak in short sentences; and repeat important points several times to make sure the

piece, the first question Yankee founder Howard Anderson asks is, "This isn't going to be another Forrester blowjob, is it?" While Anderson insists he's proud of the business his protégé has built (Colony worked for Yankee before starting Forrester), he worries about clients seeing analysts' insights in the mainstream media before the clients themselves get their hands on the research. "If you've done good research," Anderson says, "it shouldn't go to *Business Week* first - the clients need to see it first."

Forrester addresses that issue by withholding press releases until eight weeks after a report has been made available to paying clients. Jupiter, which views itself more as a deadline-oriented publishing business (the division analysts belong to is dubbed "editorial"), takes the opposite

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tack. Jupiter frequently scoops its own newsletters, offering exclusives to publications like *AdWeek* and *Advertising Age* when it releases reports on the amount of money being spent on online advertising. DeRose maintains that the slow production cycle of Jupiter's newsletters necessitates giving some of their breaking news to the mainstream media to prevent leaks.

DeRose points out another of the dangers of playing the get-quoted game: dealing with the media can eat up valuable research time. During the week that rumors about an AOL purchase of CompuServe began to swirl, and Microsoft had just announced its acquisition of WebTV, DeRose says his analysts were swamped with calls. Colony says he too stresses the importance of balancing research needs with reporter interviews, and even jokes about instituting a penalty for cutting too high a profile in the media.

Even so, the chiefs of Jupiter, Forrester, Meta Group, and Yankee all agree that getting quoted helps them lure new clients. But press visibility can also have a danger-

asking customers to ration their usage was "a really stupid tack." Shortly thereafter, he received a call from Jupiter client Steve Case, who was not pleased about being dissed in his hometown paper and wanted to explain the rationale behind America Online's strategy. "In retrospect," Schoenfeld says, "I felt that 'stupid' was a poor word to use, because it's not very descriptive." More recently, Schoenfeld was drawn into a contentious email exchange with Pathfinder executives after he told *The New York Times* that "no one could rival them for sheer cash-suck."

Will such run-ins squelch Jupiter's desire to be the most vocal, visible, and profitable company in the consumer research arena? Not likely. CEO Gene DeRose is confident his company can ride a 10- to 20-year growth cycle that's only just getting started. "This is before the beginning," he says.

Which means we can expect to see a lot more high-profile predictions from Jupiter and Forrester analysts in the years ahead. "As long as technology remains confusing,

**"If your circulation is less than 30,000,
please understand that the volume of requests
that we receive may prevent us from returning your call."**

ous side effect: offending existing clients. Colony and his analysts, for instance, have incessantly criticized Microsoft's forays into content and entertainment. The result: "Bill Gates hates me, and they're a very large client," Colony says with a smirk. He proudly declares that his company never pulls a punch - even if it could lead to losing a client as important as Microsoft.

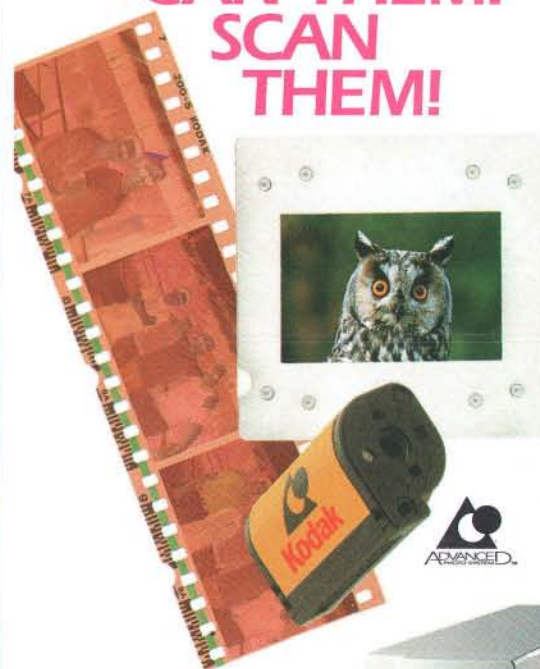
The loquacious Schoenfeld has antagonized his share of clients, too. For a front-page article in *The Washington Post* earlier this year, Schoenfeld was asked to comment on AOL's request that its users not go online so much, due to heavy traffic following the company's switch to an all-you-can-eat pricing scheme. Schoenfeld said

it's going to remain a strong market for these companies," says Catherine Baker, who follows Forrester's stock at Robertson, Stephens. So barring a dramatic drop in the complexity level of new technology, clients will still rely on Jupiter and Forrester to understand it, and journalists will still call for the companies' help in explaining it.

That suits both firms just fine. Quoth Jupiter's Schoenfeld: "I never met a jar of ink I didn't like." ■ ■ ■

Scott Kirsner (kirsner@worldnet.att.net), according to Internet market researchers, will be a billion-dollar industry by 2000. He lives in Boston's North End.

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Dumpster Diving

There's big bucks in tech trash.

By Cory Doctorow

www.wired.com/5.09/dumpster



In the icy midnight parking lots of strip malls and industrial parks, a band of bit-heads burrows into a strange legal gray zone – trash – and emerges with high tech pay dirt.

When my grandfather came to Toronto after the war, arriving via Halifax on a refugee boat from Hamburg, he went into business as a rag-and-bone man, riding a horse-drawn cart through the streets, salvaging scrap metal, fabric, paper – trash. Eventually, the business grew into a scrap yard and produced the money for a split-

level ranch home in the burbs, university educations for his kids, and a condo in Fort Lauderdale for his retirement years. He built his house on garbage, but that fact never struck home for me until I met Darren.

Tonight, Darren, Mike, and I are cruising through the self-same suburb in Darren's police-auction paddy wagon. Darren handles the

armored truck like my grandfather drove his Caddy – fast enough to make a committed cyclist like myself flinch, but with a great deal of precision as he weaves in and out of late-night traffic on the icy streets.

We're whipping through sprawling, one-story industrial plazas, slowing only to take a closer look at the dumpsters. We're all bitheads, but we're not looking for unshredded hard copy – that's old news. We're after tastier trash.

Finally, we spy a likely-looking site, a strip mall where the lone restaurant is perpetually going out of business. Mike puts on the superwarm jester's hat his mom made for him the year before he dropped

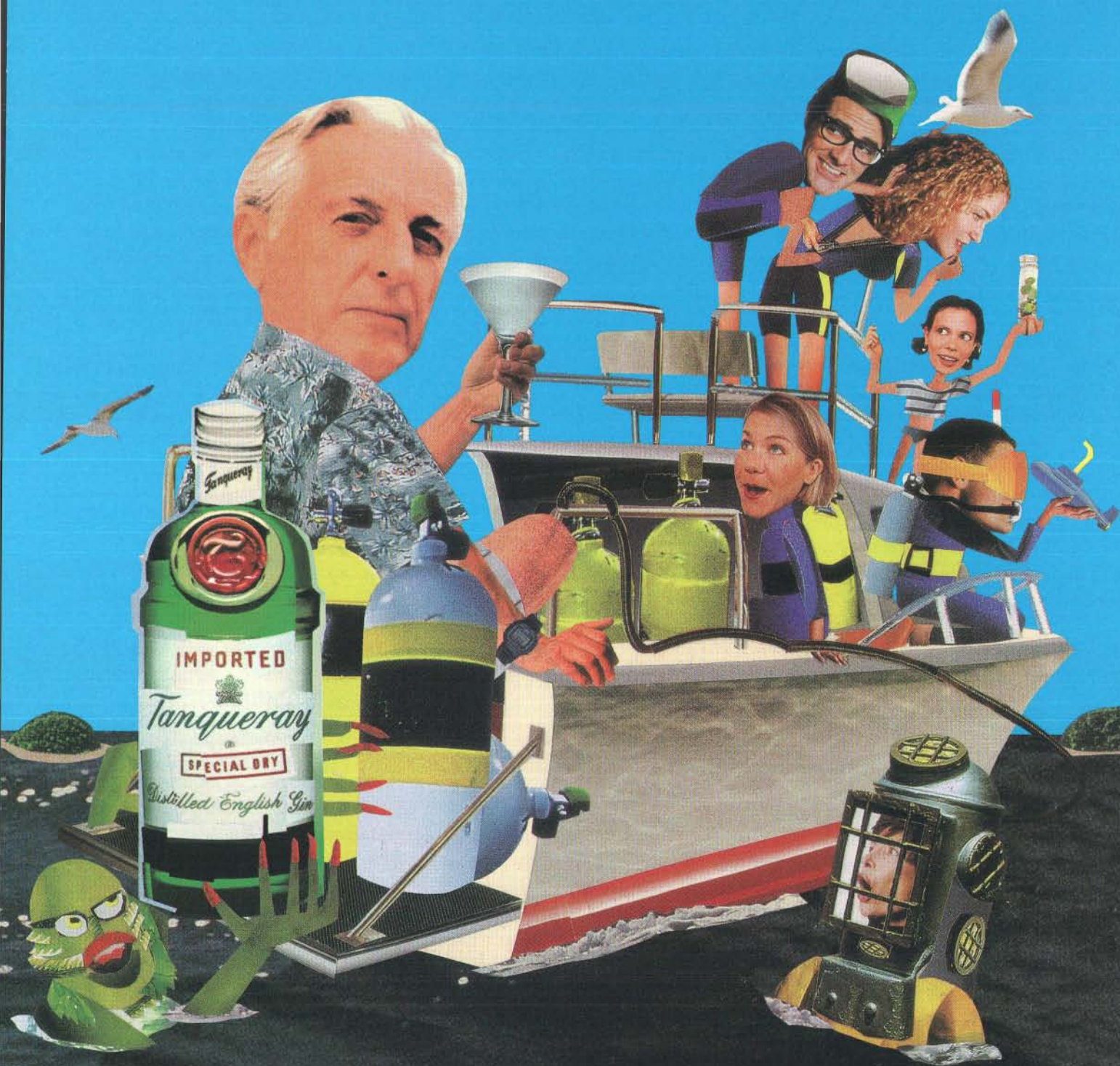
out of electrical engineering at Ryerson Polytech. Darren pulls into the driveway, past the circling minivans of parents waiting to pick up kids from swimming lessons at the strip mall, and pulls up around back, along a row of dumpsters. He tugs a woolly toque over his long hair, zips up his army-surplus jacket, and puts on his heavy leather gloves.

I grab my own gloves and scramble to catch up. Darren's already headfirst in a dumpster, and a minivan is pulling up 20 yards from us, switching on its high beams. Darren looks at it. "A fucking vigilante. Thinks I'm here to *steal*" – like it's a dirty word. "Let him sit there. It's working light."

Darren dives back into the dumpster, flashlight clenched between his teeth. He tosses something onto the ice at my feet. It's a $\frac{3}{4}$ -inch Beta cassette, labeled "Bonanza Episode 87-5654." I peer cautiously over the dumpster's edge. Hundreds of broadcast-quality tapes. Darren pushes them aside, looking for something with a higher dollar-to-dimensions ratio. The paddy wagon's already half-full of spent laser toner cartridges and 386s, which occupy a lot of volume in a cargo space designed, after all, to transport humans in shackles, not the high tech detritus of Toronto's profligate industrial parks.

There's nothing but reruns in the first dumpster, so Darren moves on. He casts long, weird shadows in the minivan's headlights. I stare into their glare and try to imagine what the guy behind the wheel is thinking. What must he make of three guys in their 20s, jumping in and out of the trash? What if he calls the cops? It makes me nervous. I mean, what we're doing isn't actually *illegal* or anything.

"Mr. Jenkins is wary of deep dives as they
have a tendency to bruise one's olives."



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Trash is a strange legal gray zone in Canada. The Trespass to Property Act – a hunk of legislation dating back to the British North America Act of 1867 – grants property owners and their rent-a-cops the power to ban anyone from the premises, for any reason, forever. The catch is, they have to actually ask you to leave – serve you with a notice prohibiting entry – then you have to return for it to be trespassing. And ever since a cop dug through a curbside trash can, looking for a ditched weapon used in a holdup, and the judge ruled that he needed no search warrant to do so, Canada's garbage has become fair game. So as long as we don't make a mess – that would be littering – we're on the warm and fuzzy side of the law.

Darren hits pay dirt in dumpster number two. "Active-matrix LCDs!" he says, and starts frisbeeing the displays to Mike, who stacks them, dozens of them, on one of the prisoner benches inside the truck.

Then suddenly Darren stops, holds one up, and his five o'clock shadow splits in a wide grin. He smashes the LCD against the frozen corner of the dumpster. "I got 500 of these things back home," he exclaims. "It's a fuckin' clown show!"

"Those garbage pickers who go after bottles, they're fuckin' nuts! Why waste time on a nickel bottle, when you can sell an empty toner cartridge for 10, 20 bucks?"

He's right – it's all absurd. In less than an hour, I've seen literally tens of thousands of dollars' worth of equipment, most of it too low on the dollars-to-volume graph to bother with. All of it in the trash. Darren's got a quarter-million-dollar recording studio, built entirely out of garbage, in a warehouse a couple blocks from my own studio. Upstairs, in a soundproofed mezzanine, is a room completely jammed with baroque computer trash: old SGI servers, NT boxes, 21-inch monitors, cables from here to Hong Kong, shrink-wrapped software, bookcases overflowing with manuals. That's just the

stuff he didn't sell. Ten Darrens couldn't even make a dent.

The vigilante behind the headlights apparently decides he's not going to be a hero tonight. He switches back to low beams and pulls away.

We knock off early. It's *cold* out, a vicious icy windy bastard of a Toronto night. Out in the burbs, there's nothing to cut the gales, and they find the chinks in your long underwear and scarves.

We head downtown for Vietnamese salad rolls. I'm mentally cataloging tonight's haul: a bushel of gold-tipped RCA cables for Darren, 20-some PCMCIA modems, the LCDs, some old 386s, laser toner cartridges – to buy it all new would cost thousands. Darren will sell it for less than a grand. Still, it's pretty good money for three or four hours' work.

Cruising through Chinatown, looking for a parking spot, we pass an electronics store with a sign in the window: "16MB SIMMs – \$800!" This sparks a story from Darren.

"Yeah, I was at this distributor out in Mississauga, and they had a dumpster filled with little cardboard boxes, like so" – he takes both hands off the wheel to form an

8-inch square – "and they each had a sticker that said 'Empty Box, Do Not Open.' You get that a lot, empty boxes they stick in packing crates so the stuff won't shift around. I see one of these boxes, sealed, but with no label. I think, well, maybe someone in Japan just forgot to put a sticker on it, and maybe someone in Toronto didn't bother to look inside, and I open it, and there's 10 16-meg SIMMs inside. Eight thousand dollars' worth of RAM! And people wonder why RAM costs so much. Sold it for five grand."

Over green tea, Darren starts to get philosophical. It's an occupational hazard.

You can't spend half your time alone in dumpsters without formulating trash cosmologies.

"Those guys who go after tin cans and pop bottles, those *garbage pickers*, they're fuckin' nuts! Why waste your time on a nickel bottle, when you can sell an empty toner cartridge for 10 or 20 bucks? They're nuts, man." He looks genuinely upset. He gets upset when he talks trash. But he also swells with pride, describing this strange little niche he's carved for himself.

"I got caught in somebody's trash one night, and the next time I went back, I found 10 CD-ROM drives, and they'd smashed 'em up with hammers, so I couldn't sell 'em." He grimaces. "It's criminal. This is useful stuff! Why would they want it to end up in a landfill?"

Good question.

Darren takes me out again, just the two of us in his landlady's ancient Buick. The night starts slowly, as we cruise past empty dumpsters.

We're in Motorola country, but that dumpster – source of hundreds of flip phones and batteries – is off-limits these days. Darren, it seems, dropped in one night and found someone else already in the trash. Two guys, in fact, pulling out featureless black boxes, the likes of which he'd never seen. The guys became, well, aggressive, and chased him off. Darren figures they were pros, industrial spies working with someone on the inside to spirit out top-secret tech via the trash.

It turns out some dumpster divers come from the other side of the thin blue line as well. "The cops around here like to pull me over," Darren explains, "just to see what kind of stuff I've got tonight. A couple months ago, I got some sports cards from this place, and they pull me over, and the cop says, 'Are you kidding me? You found these in the trash? My kid spends a fortune on these.' So I come back a couple nights later and bam, there's the cop, headfirst in the trash. Hell, I don't care. Plenty more where that came from."

"Speaking of which," Darren says, "there's

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another place I want to check out. They moved a couple months ago, but they still haven't put a dumpster out at the old site. There's got to be tons of stuff, just waiting to be trashed."

And there is. Acer America Corporation has a big old 40-cubic-yard dumpster out. It's about a third full. Darren smiles and sticks the end of his flashlight between his teeth.

This dumpster is the night's big score. We find 400 laptop batteries, five 15-inch Trinitron tubes, half a dozen laptop hard drives, most of a carton of shrink-wrapped PowerPC monitor adapters - I wince thinking of the 60 bucks I shelled out for one a few weeks back - voltmeters, multitesters, and enough miscellaneous monitor hardware to fill the whole backseat of the Buick. Cash value? Ten thousand Canadian (around US\$7,150).

Of course, it's going to take some effort to turn this garbage into money. There's a guy who takes in the monitor trash, and for every two units he can build from it, Darren gets one. Only half the laptop batteries can be salvaged, by cannibalizing what good cells remain from the other half.

This dumpster is tonight's big score: 400 laptop batteries, 6 hard drives, shrink-wrapped monitor adapters, and much more. Cash value? Ten thousand Canadian.

The salvage guy will keep half of those. That leaves Darren with 100 power packs, retail C\$200 - if he can find a buyer at \$75 a pop, that's \$7,500 right there.

After a good two hours sorting the trash and loading the car, Darren carefully restores the dumpster to its original state, making sure that the same kinds of trash are back on top, that there are no suspicious holes or visible bootprints. With luck, Acer will refill the dumpster over the next week; once the trash is up to the rim, Darren can start tunneling, building corridors shored up with cardboard flats from the recycling bin a few yards off.

Around 2 a.m., Darren drops me off at home, a couple blocks from his multimedia studio, then heads home to unpack the haul. I'd offer to help, but I'm freezing, and my stomach is one big bruise from using it as the fulcrum to lever myself into the dumpster. Darren, on the other hand, is as graceful as a gymnast, vaulting dumpster lips, making impossible twists in tight corners, stooping double for long stretches while he burrows.

Acer America Corporation doesn't know what to make of my phone call: "Hi, I'm a freelancer writing a piece about a guy who made 10 grand off stuff you threw out when you moved."

I end up being transferred to Marc DeNola, head of security and safety.

"Every product," he intones, "has a product life. In a high tech field, the product life can be quite short. At some point, a decision has to be made as to whether there is any salvage value. When something is discarded, it means that the storage costs are greater than the value of the item."

Why not donate the discards to charity, or hold a yard sale, or give them to schools?

Karen Grant, of Acer's PR company Editorial Edge Inc., insists that schools aren't interested in salvage - they want complete, working systems. As for yard sales, "It's something we'll have to look into."

So then why are the dumpsters at the new Acer site kept indoors, behind locked doors?

"It's part of the comprehensive security program," DeNola explains. "These days, we take security much more seriously." ■ ■ ■

Cory Doctorow (doctorow@magic.ca) is a science fiction writer, columnist, and multimedia developer.



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New Media RIP

By Jason Chervokas

Stop me if you've heard this cyberdream recently: "Hey, let's do a personality-driven content site designed to engage people in daily chat and threaded discussion." Basically, this commonly heard business plan is the digital, text-driven equivalent of a phone-in radio talk show.

"Let's build something unique for this medium," other folks say, "something that uses streamed video and audio." Now, isn't this something that film, television, and radio have been doing for a century?

Or how about this one: "Let's set up some kind of online sweepstakes or gaming site, collect data on our players, and sell it for direct-marketing purposes." Great. Has anybody registered Ed-Mcmahon.com yet?

Media historian Erik Barnouw, in his book *Tube of Plenty*, describes a TV programming trend he calls "It's Completely Different From, But Exactly the Same As." Thus *The Addams Family* begat *The Munsters*. *Friends* begat *The Single Guy*. In the new media world, where evolutionary cycles proceed like generations of houseflies, we're already replicating the pattern.

What, in other words, is so new about new media? Most of the original talk about new media focused on CD-ROM and clickable multimedia environments. The result has been the creation of new media, notably videogames and kids' CD-ROMs for learning and entertainment. Virtual worlds like *Myst Island* remain pregnant with promise, as do various 3-D environments that can be inhabited by multiple users.

And there certainly are hundreds of exciting ventures and ideas floating around among the cybercognoscenti. Vertically targeted online communities with database resources, discussion groups, and online commerce components that target professionals like doctors – this is fascinating alternative media that could replace or threaten trade publishers and associations by using the technology to do something two-way and audience-empowering. It may even be new media.

But is publishing a webzine new media just because it's distributed online or has a discussion group attached to it? When a company like SonicNet launches a news wire service, a radio wire service, a television syndication special, and other traditional media properties, can we still describe SonicNet as a new media company? Or is it just a media company? And if it's just a media company, is that so bad?

The new media ideal promised three radical ways new media would be different from traditional media. First, new media promised to enable new voices. Because the barriers to entry are lower on the Net than in traditional media, Internet publishing was supposed to create a platform for people who in the past had little input into the shape of traditional media, meaning not only racial and ethnic minorities – who watched for a century as the nation's dominant ethnic majority defined the way they were portrayed in books, television, and film – but also political dissidents, regional publishers, and others.

Second, new media promised to break down the walls that traditionally separated media content creators – journalists, artists, et cetera – from their audience, audience members from sources, and audience members from one another. Third and finally, new media was supposed to open up new markets, enabling new and different kinds of retailers to sell new and different kinds of products to new audiences.

So, how does the new media scene stack up?

"There is perhaps in every thing of any consequence a secret history which it would be amusing to know, could we have it authentically communicated."
– James Boswell

"The ease with which electronic impulses can be manipulated, modified, and erased is hostile to a deliberate legal system that arose in an era of tangible things and relies on documentary evidence to validate transactions, incriminate miscreants, and affirm contractual relations."
– Anne W. Branscomb

"Information wants to be free" is a statement only info-pimps could love. Indeed, our names, addresses, attributes, habits, and histories are bought and sold each day. Yet the aggregation of personal facts we

present
and represent
tells

Body of Evidence

By Tom Claburn

a story, a narrative even, of our journey through life. Are we not the authors? If we must lubricate the ups and downs of the information economy with our life stories, we should at least come to some profit by it. Let the facts that describe us become not dividends for the data miners, but the assets of our business, the business of being alive. Your choice of cola, your telephone number, your mother's maiden name – demand that the law recognize these things are all truly yours, to be licensed and sold only by you as you see fit. The coupling of facts is a creative act, and those facts – our stories – should belong to us.

Tom Claburn (tom@wired.com) is production coordinator at Wired.

"In a fully free society, taxation – or, to be exact, payment for governmental services – would be voluntary. Since the proper services of a government – the police, the armed forces, the law courts – are demonstrably needed by individual citizens and affect their interests directly, the citizens would (and should) be willing to pay for such services, as they pay for insurance."

– Ayn Rand

There have been new voices enabled. Gay publishing has certainly exploded. There are a handful of serious attempts to do alternative political community-building online. But the established new media firmament has shown little desire to enable new kinds of voices. The city guides and newspaper sites give us the same collection of voices we have always gotten. Sidewalk's got Bryan Miller, the former *New York Times* restaurant critic, reviewing hip Manhattan eateries, for example. Even the small media start-ups are the creation of Ivy League-educated white men, for the most part.

iVillage has tried to break down traditional barriers separating marketers and content creators from the audience and to open up spaces for audience members to reach each other. So has EarthWeb, via its Gamelan and Developer.com sites. Still, most of the rest of us just use the Net as a delivery mechanism to pump traditional print or broadcast content at a passive audience.

Finally, though there have been fascinating attempts by companies like N2K to set up alternative retail channels to sell music and even create custom CDs, for the most part we in New York have decided to set up online channels that essentially mimic traditional retailing. There are exceptions, of course: Miles Rose's snack cake distributor Regional Delights, or Glenn Hauman's promising BiblioBytes. But both efforts remain undercapitalized and underrealized.

Of course, using the Net to distribute print or broadcast media, or to set up an alternate distribution channel for traditional products, is an exciting thing. It threatens the hegemony of traditional media manufacturers and distributors. But it may be time to give it a new name. *Alternative media*? Maybe, though that smacks of the marketingspeak record companies used to sell the same old rock and roll to a GenX audience. *Internet media*? Certainly. It subsumes *new media* – there's no reason Internet media can't be new media, but it can also refer to what we do most of all: bring traditional media into the Internet age.

Jason Chervokas (jmc6@ix.netcom.com), coauthor of the *CyberTimes* column "Digital Nation," is editor and cofounder of @NY (www.news-ny.com/), the New York Internet newsletter in which a version of this article first appeared.

Pop music savants tend to think of sampling as a revolutionary new concept, a

post-modern challenge

Medieval Sampling

By Larry R. Larson

to music culture built upon structured appropriation.

Wrong.

A form of music endemic to late medieval France, the motet, used multiple quotations from both sacred and "popular" work as building blocks to construct a larger musical piece. What began as the introduction of new text (i.e., "word," from the French *mot*) to older music ultimately created more varied rhythmic patterns. To 13th-century ears, this was like laying down beats around a James Brown chorus.

Medieval composers are said to have reflected the gestalt of their time, a hierarchical view of society as cathedral. The question is what today's sample-based music – whether it's hip hop, trip hop, techno, or acid jazz – says about our worldview.

Larry R. Larson (lrlarson@halcyon.com) heads a new joint venture between Laurie Anderson and Interval Research Corp.

Paying Attention

By Tom Portante and Ron Tarro

Addressing a rapt audience of technology futurists, UCLA English professor Richard Lanham recently extended some ideas from his book *The Electronic Word: Democracy, Technology, and the Arts*. If economics is the study of how human beings allocate scarce resources, he proposed, and if we are now moving from the goods economy to an information economy, then it would seem to follow that information is the scarce resource on whose allocation market leaders must focus.

"Among modern occupations, only cult leaders and TV weathermen rival the technological visionary's ability to retain credibility despite all evidence to the contrary."

– Nathan Myhrvold

The background is a vibrant, abstract collage of geometric shapes in various colors including orange, blue, yellow, pink, green, and purple. Large, stylized letters are scattered throughout, such as a large 'R' in the top left, a 'T' in the top right, and a large 'W' on the left side. The overall aesthetic is bold and modern.

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"The most common and durable source of factions has been the various and unequal distribution of property."
— Alexander Hamilton

Of course, Lanham reminded the audience, the world isn't nearly that simple. We are awash in too much information in too many forms from too many sources. From an economic perspective, information in this world has neither sustainable value nor predictable economic behavior. Is it wise, then, to build businesses or design information systems around the assumption that information has value? If not, do we discard economic theory or disavow the idea of a knowledge-based economy?

The single most valuable commodity, it turns out, is human attention, the set of intellectual processes that converts raw data – the firehose of unfiltered experience bombarding us in everyday life – into something we can use. But does attention itself have value? Can it be allocated? Do we need to be parsimonious with it, or are there imaginable processes and tools we can use to discover an elasticity of supply? Can we, in other words, apply some variant of economic theory to understand an attention economy? Can we use this perspective to help us create attention-based business processes and models? And can this perspective help us create the next generation of information products?

Until the 1990s, senior managers struggled to get the information they needed.

Mortal Kontract?

By David M. Bridgeland

Now they have everything they ever wished for – and more. Yet while intelligent agents now do most of the dirty work of mining data, there is a better way. A game environment is the perfect interface for large amounts of business data. Because the kinesthetics of any simulation model can be learned best by playing, the game becomes both a playground for discovering new skills and a testing ground for strategies and projects too dangerous or expensive to try in the real world. In the end, we have as much to learn from *Super Mario Bros.* as Salomon Brothers.

David M. Bridgeland (davbr@powersim.com) is vice president of simulator development at Powersim Corporation.

A range of seemingly disparate R&D efforts suggests the answer is yes. A growing body of technology research presumes a centrality of human attention: various MIT Media Lab programs, for example, like Things That Think and Tangible Media; Xerox PARC's work in ubiquitous computing and calm technology, which encalms by moving easily from the periphery of our attention to the center and back; and, finally, the Institute for the Future's positioning on microelectromechanical systems. Each endeavors, in its unique way, to reconsider the dynamic and holistic interaction between people and their information environment. Each derives insight from the understanding that while information is infinite, mindshare is not.

To shape businesses or create products, this perspective requires an exchange of ideas between professions and professionals as widely varied as storytellers and economists, gamemakers and advertisers, product developers and psychologists. We need this range of disciplines and participants to think more clearly about the issues defining the economics of attention.

In the end, probing our assumptions about attention will redefine where and how computational horsepower can be applied. Indeed, the economics of attention will illuminate what computers can become.

Tom Portante (portante@well.com) and Ron Tarro (ronald.tarro@ey.com) are management consultants at Ernst & Young LLP.

Reliable sources report that anyone can send any information they wish to anyone else via the Internet. As the network develops, any sort of print censorship or publication ban will become impossible in a practical sense. Governments and private parties will be

largely unable to prevent

Note to All Media

By Duncan Frissell

transmission of information from willing senders to willing recipients. State secrets, copyrighted material, hate speech, pornography, sports scores, bomb plans will all be available to whoever wants them. Bandwidth increases will render meaningless government control of the broadcast industry and protected broadcasting oligopolies will be terminated. Many government regulations of business will be rendered meaningless as well. Production and sale of nonphysical goods will be completely deregulated, and many services that can be performed at a distance will be deregulated without reference to legislative or administrative process. Anything you can imagine – and a lot you can't – will be available via the Internet.

Duncan Frissell (frissell@panix.com), a lawyer and writer in New York, is one of the first members of the cypherpunk list.

"There is nothing special about words."
— Lisa, in *Speaking Parts*



Telegraph



Electric Car



Movies



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Cordless Telephone



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A photograph of a lit firecracker. The firecracker is wrapped in red paper with a white floral pattern and is tied with a piece of light-colored twine. It is positioned diagonally across the frame. The lit end is on the left, emitting a bright orange flame and a large spray of golden sparks and white smoke that extends towards the top left corner. The background is a dark, textured grey.

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especially among its
obsessed creators.

Jon Carroll on the exclusive inside story of making *Riven*.

www.wired.com/5.09/riven/



On my last evening in Spokane, after I had wandered *Riven's* caves and forests, after I had turned a dozen animated valves and seen a dozen mysterious thrones and eaten of the five-lobed fruit, after I had lingered under the winking planetarium in the basement lair of the creators of the caves and forests and valves and thrones one last time, after I had brooded about landscape and mem-

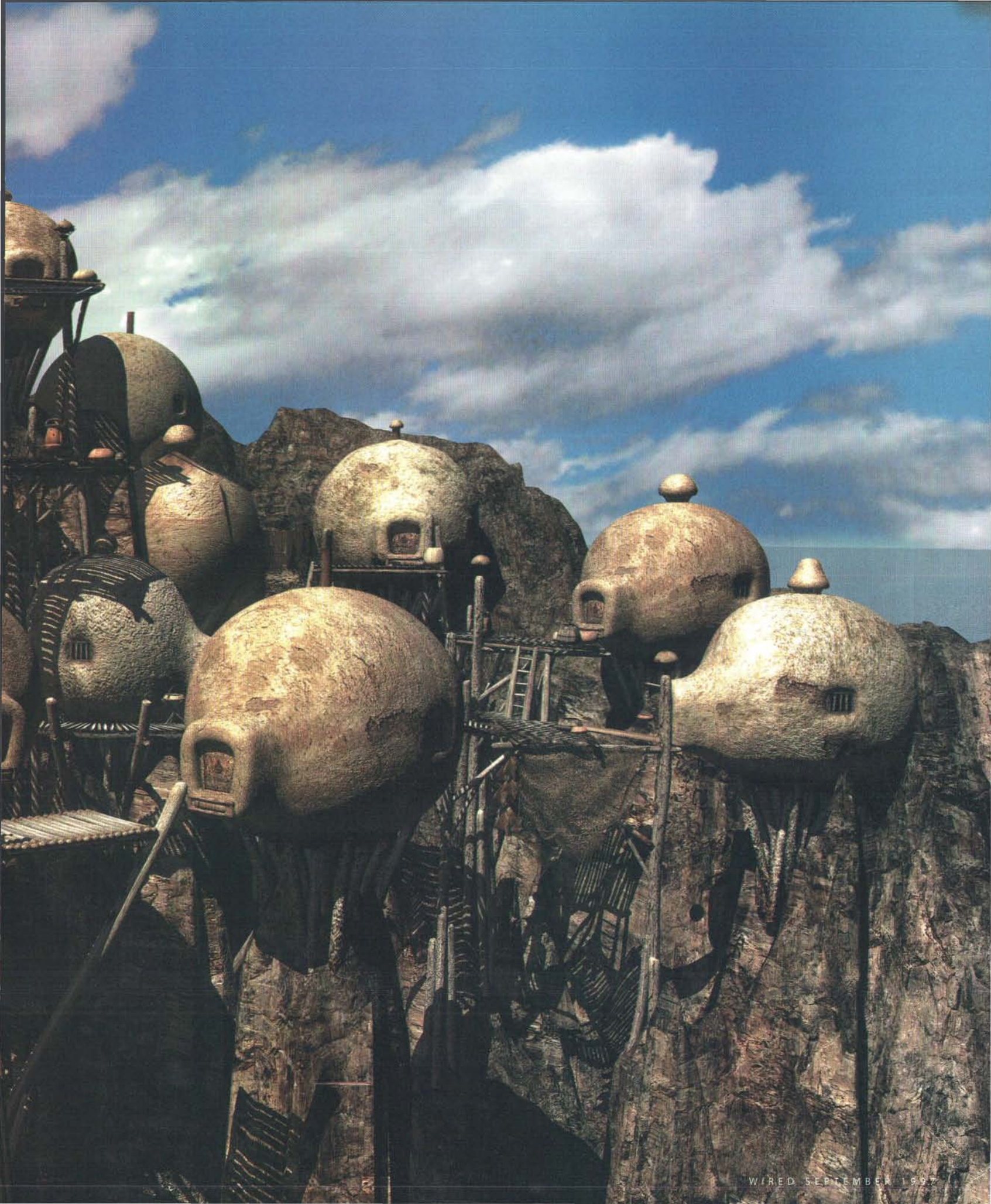
In the corner of a strip mall on the northern border of Spokane, Washington, stood a mattress store called Comfort World. The only sign of its former tenants was a distinctive blue trim that ran along the roof line, a sort of deep aqua that people who work with color might call cyan. I had been in that building one year

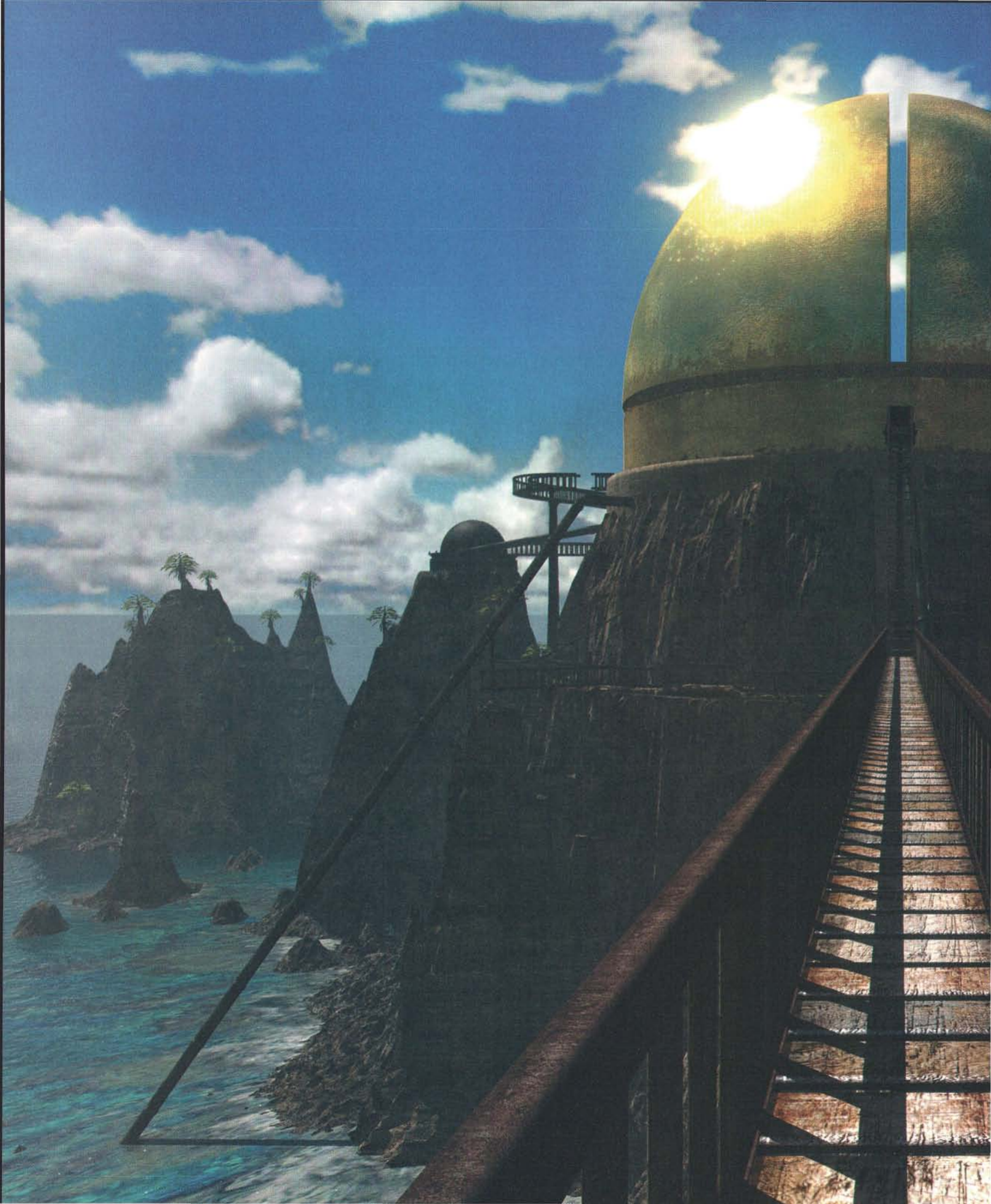
before, when the company called Cyan had been occupying it. As tacky and ungainly as the building was, it was a step up from the old Cyan offices in the garage of the man named Chris Brandkamp. That garage (the walls of the conference room downstairs had been plastic, with tiny clattering space heaters that barely cut the chill - I could remember meetings in that office where all the participants looked as though they were about to mount the final push for the Pole) was in turn bigger and more luxurious than the basement of Robyn Miller's house, where *Myst* had been created. *Myst* was what kept me coming back to Spokane, *Myst* and its successor, *Myst II* (as it was called in the garage days) or *Riven* (as it is called today). *Myst* was the best story I had ever stumbled onto. It was an astonishing phenomenon, a computer game produced by some people in rural Washington, not near the Microsoft-shadowed Seattle

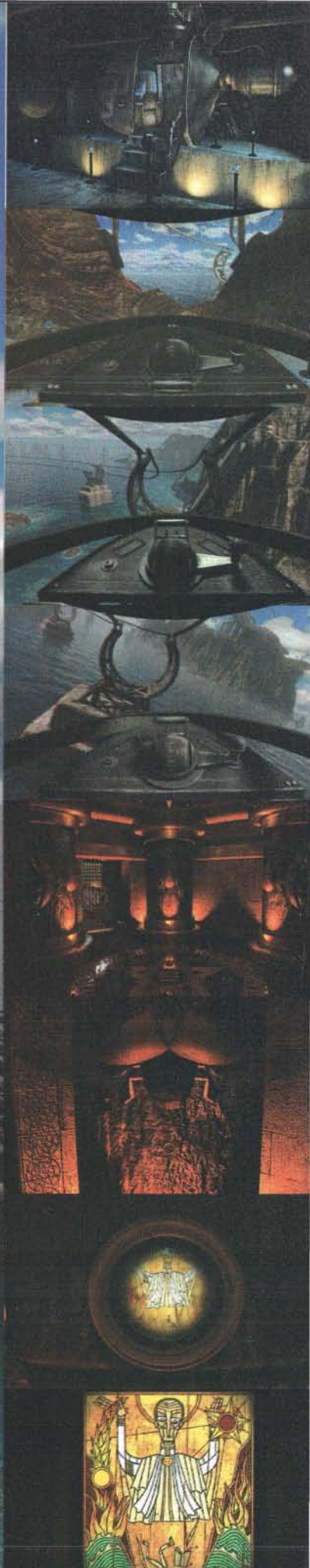
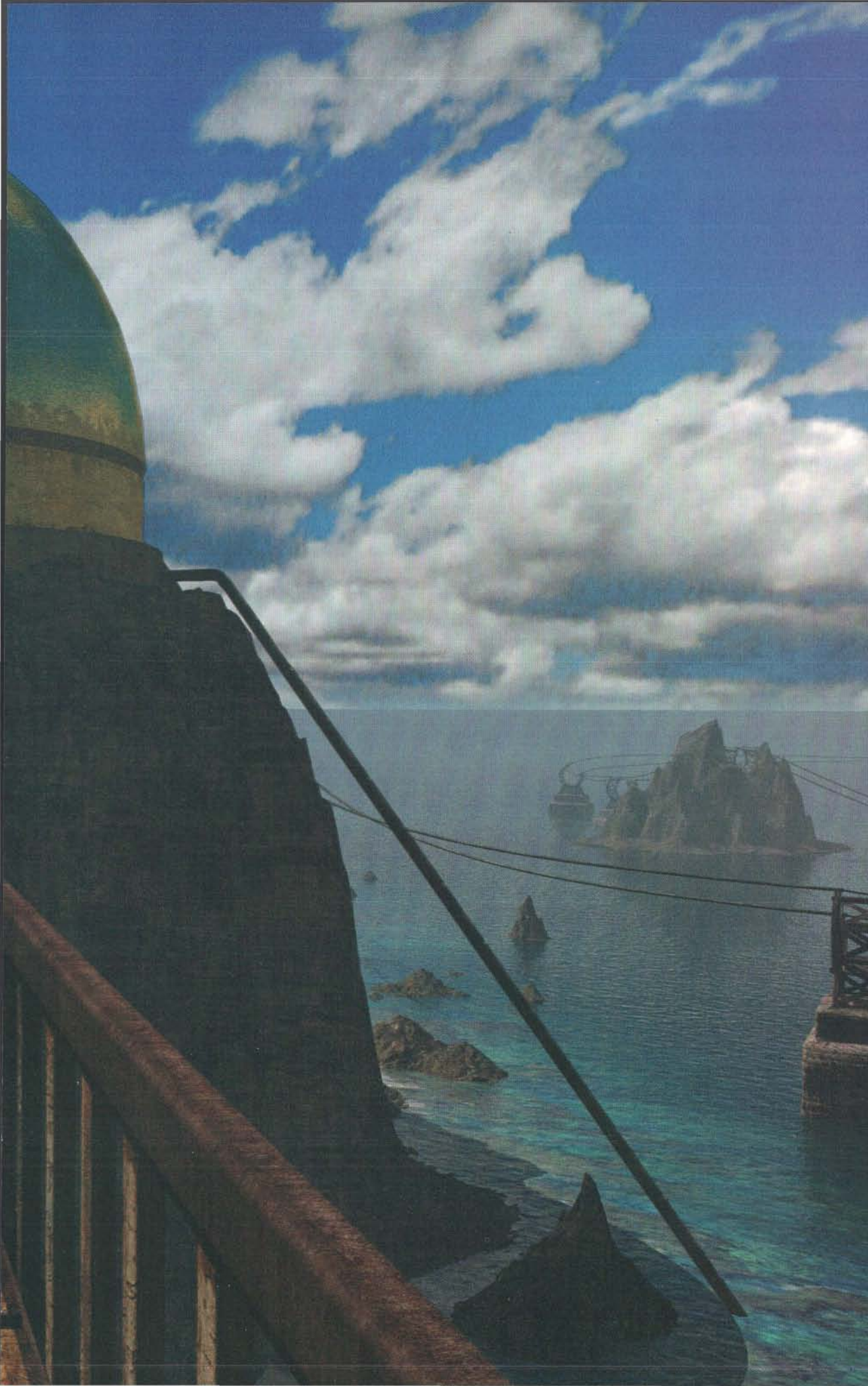
ory and constructed lonely theories on the deserted highway; after all those things, I revisited the place where the story began again.



Riven's imagery and landscapes are even more astounding than its predecessor, *Myst*.







but way over on the eastern edge of the state, near nothing else. And from this unlikely soil had sprung a game that topped the sales charts for years, a mysterious nonviolent ruminative scary passionate CD-ROM experience like nothing the world had seen before.

When matched against, say, Vermeer or Melville, it wasn't much, but in the limited world of computer games, it was high art. It was Shakespeare. At the time I stood there in the parking lot, in May of this year, *Myst* had sold 3.5 million units. Figuring very conservatively, that meant something like US\$20 million had rolled into tiny Cyan, not counting subsidiary rights, sundry accessories, book deals, and T-shirts.

And the story behind *Myst* was even stranger than these figures. Its creators were two brothers, Rand and Robyn Miller, evangelical Christians who lived in the literal backwoods of

We believe in money, we believe that money corrupts, and we believe in corruption. We despise the cycle, and we rush to embrace it.

I walked across the puddled parking lot and peered in the windows: a panoply of products designed to provide gracious horizontality. I saw the dim shadow of the reception desk, minus the cut-glass bowl of hard candy that had been a Cyan tradition from the beginning. I remembered ...



April 1996: Bonnie Staub looked cold. Her nose was red. She was wearing a down parka and gripping a sheaf of papers. There is in every good office a person who acts as the hub and pivot, the person who can always find the

THE MYST VALUE CHAIN

THE BOOKS

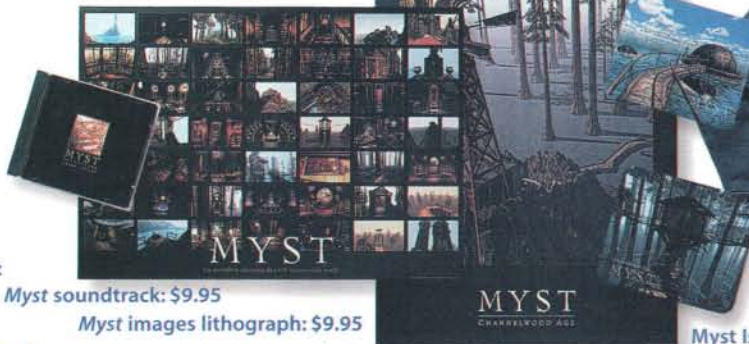


Myst: The Book of Atrus: \$17.95

Myst: The Book of Ti'ana: \$17.95

Myst: The Book of D'ni:
(not yet released)

THE MERCHANDISE



Myst soundtrack: \$9.95

Myst images lithograph: \$9.95

Channelwood mousepad: \$6.95

Myst navy sweatshirt: \$24.95

Myst Island mousepad: \$6.95

Published by Hyperion Books;
more than 400,000 copies sold worldwide.

Channelwood lithograph: \$9.95

eastern Washington, in homes surrounded by pine trees (Rand) or wheat fields (Robyn), in country that was not far from a fortified enclave called Ruby Ridge. They made up *Myst* entirely out of whole cloth - strange cloth, cloth not available in the great centers of commerce. When I first met them in 1994, after *Myst* was a certified hit but before they had seen much money from it, they were about to cross uncharted waters. Money was about to come flowing in, money and prestige and temptation and pressure. They were about to become some version of the oldest American narrative:

Jon Carroll (jrc@well.com) writes a daily column for the San Francisco Chronicle. He wrote "Guerrillas in the Myst" in Wired 2.08.

things that are lost and forget the instructions that are unwise, who has such a good grip on the truth that she knows when to lie, who has a loyalty not often rewarded with a salary commensurate to her value. Bonnie was that person at Cyan; she returned my phone calls and gave me useful information; even her studied vagueness had content. And she seemed to be fighting some undefined strangeness, a peculiar gloom created from cramped offices and bad vibes and the lingering Spokane winter and something more. It all made me fretful. Something was up.

I had come up to Spokane expecting *Riven* (it had just been finally named) to be almost ready for beta testing. It was due out before Christmas, maybe as early as September. This

date had not been officially announced, but that was what Broderbund (the distributors of *Myst*) had been telling people, because that's what they had been told. Rand Miller had discouraged me from coming up. There were deadlines, he said; there were people from out of town; there was no time right now to meet with the press. I had talked it over with Bonnie. I decided to come up anyway, to interview whoever was available, to sit in the lobby if I had to, to wheedle and snivel and tag along behind. There was much of my own ego in this - I was proud that I had written the first big story about *Myst* and the Miller brothers; I wanted to maintain my lead, cement my contacts, follow *Riven* wherever it was going.

I also wanted to see *Riven*, but there wasn't much to see. Some renderings, almost breathtakingly lovely but somehow immobile, unconnected. It was almost as though they had

"Sirru's Room" gray T-shirt: \$11.95



Myst Island mug: \$9.95

Myst duffel bag: \$29.95

"Stoneship Age" dark olive T-shirt: \$11.95

cooked something up to appease the gods of marketing. Even worse, no one looked happy. The Cyan offices in 1994 had been almost giddy, alive with the enthusiasm of creation. Two years later, the expanded staff sat morosely at their machines. On their screens were wire-frame renderings of inconsequential objects - tiny pipes and curious pistols, rivets, and valves. It did not look like a project that was seven months away from huge glossy stacks of boxes in every computer superstore in the universe. One heard rumors, of course. The rumors might very well have come from people who wished the Millers ill, because the odd success of *Myst* had made a lot of high-powered gaming executives look dumb. But that did not mean they weren't true. 170 ►

The Myst Phenomenon

***Myst*: The best-selling computer game of all time**
The Lord of the Rings*: The best book of the century
***Jurassic Park*: The biggest box office movie of all time**

Millions earned in US by *Jurassic Park* since its 1993 release: \$357

Millions earned in US by *Myst* since its 1993 release: \$130

Ratio of *Jurassic Park*'s total earnings to production costs: 6:1

Ratio of *Myst*'s total earnings to production costs: 260:1

Number of weeks it took to recover development cost of *Jurassic Park*: 1

Number of weeks it took to recover development cost of *Myst*: 12

Consecutive weeks *Jurassic Park* topped the domestic box office: 2

Consecutive weeks *Myst* topped the computer game best-seller charts: 104

Millions of copies of *The Lord of the Rings* trilogy sold worldwide since its 1954 publication: 20

Millions of copies of *Myst* sold worldwide since 1993: 3.5

Average annual copies of *The Lord of the Rings* sold since its publication: 470,000

Average annual copies of *Myst* sold since its release: 945,945

Number of hits retrieved for Net search "Jurassic Park OR The Lost World": 20,000

Number of hits retrieved for "Myst OR Riven": 30,000

Number of people who worked full time on the development of *Myst*: 6

Number of people who worked full time on the development of *Riven*: 27

Number of people who worked on *Jurassic Park*: 500

Years between the release of *Jurassic Park* and its sequel: 4

Years between the release of *Myst* and its sequel: 4

MONETARY FIGURES REPRESENT US SALES ONLY.

*BASED ON A POLL OF BRITISH READERS.

Wired: Dolly set off quite a stir ...

Stock: This is a very significant moment – we are becoming the objects of our own technological processes. We are seizing control of our own evolution, and there is the natural feeling that maybe we shouldn't.

Why the fear?

The basic fear – ironically – seems to be that through genetic engineering we will lose control of our fate. But it's not as if we can draw a line, so that things will somehow remain as they are. Besides, we're not chaperones of the future. The next generations are going to grow up in a radically different environment. We have to trust them to make the right decisions for themselves.

You've talked about extinctions being one of the consequences of new technology ...

The planet is undergoing a massive extinction – it's quite possible that half the species alive now will die out in a matter of centuries. But Earth has already seen four extinctions, all of them very traumatic. If it hadn't

been for the Cretaceous period (when the dinosaurs died off, 65 million years ago), it's unlikely that we'd be here. Before that, mammals were a pretty minor group.

The unique thing about the current extinction is that we're at the center of it, and there's a lot of guilt about that. Part of it comes from viewing ourselves as somehow outside the life process. To me, modern technology is a major evolutionary transition – as important as when the first cells came together to form multicellular organisms. It would be astonishing if that occurred without disrupting existing life.

I'm not arguing that we shouldn't pay attention to what we're doing. But even if we act responsibly about the environment – and there's no reason for degrading it in ways that do nothing but diminish our quality of life – major changes are occurring, and there is no avoiding that. We are reshaping the biosphere and establishing a new ecosystem around ourselves.

Should genetic research be regulated?

It's wise to develop some guidelines, but it would be absurd to go too far – the equivalent of trying, at the time of the Wright brothers, to write regulations for today's aviation industry.

What about the White House's immediate reaction to the Dolly announcement: a ban on federal funds being used for human-cloning research?

Unlike Bill Clinton, I do not see human cloning as a challenge to our ideas about what it means to be human. That said, the procedure should not be attempted until it is safe. Cloning from somatic cells is very difficult, and the process will need serious refinement before its

use on humans can be seriously considered. And important questions still have to be answered. For example, will Dolly exhibit premature aging or other side effects? **So you don't have a problem with the special presidential commission recommending a three- to five-year flat ban on human cloning?**

It is very reasonable. By neither limiting animal research nor banning research on unimplanted human embryos, the ban will not impede scientific progress. And it may give pause to the wackos who see cloning as a path to immortality or are contemplating strange and greatly premature human experiments. A longer ban would be a mistake, but this one may prevent some accident that would inflame passions.

Can we differentiate between genetic therapy – treatment to prevent inherited diseases – which seems to have broad acceptance, and what's being called human enhancement, which clearly doesn't?

The line is not real. For example, human growth hormone was originally used for children who were far below normal height. Now it's increasingly being used for children who are slightly below normal. At what point do you tell people they can't do that?

What about technologies that blur species lines?

Bacteria routinely transmit genetic information – that's how they get resistance to antibiotics so easily. In a sense, that's happening now in higher organisms. We're starting to move human genes into laboratory animals – producing farm-animal milk, for instance, with proteins found in human mothers' milk. The definition of a species is reproductive isolation – a lack of interbreeding. Once we break down the barrier to the movement of genetic information, then the idea of species isn't as meaningful.

How soon will we clone humans?

I was with a group of scientists recently at a UCLA seminar, and most thought it would be done within 10 years. But they also thought that news of it might not be reported, at least not immediately.

Won't some people view these new variations on life as soulless replicants, something out of *Blade Runner*?

We can go in two directions. One is to narrow our empathies, the other is to broaden them – which is what I think is happening. People have talked about growing clones for organs – nonsense. A clone would be viewed as a person, just as an identical twin is. And before long it's likely we'll even become emotionally tied to the increasingly sophisticated electronic devices around us. Once they mimic conscious behavior, we will *like* them and may not want to turn them off. Why would we feel any less attached to modified humans? If anything, genetic engineering is going to expand our sense of what it means to be human. ■ ■ ■

Roderick Simpson (maclean@well.com) wrote "Critical Mess" in Wired 5.06.

Clones you can love. A radically reshaped biosphere. Mass extinctions. Gregory Stock, a fellow at UCLA's Center for the Study of Evolution and the Origin of Life, says a new era in evolutionary history is about to burst upon us. A biophysicist by training and author of *Metaman: The Merging of Humans and Machines into a Global Superorganism*, Stock believes that genetic engineering is simply the next step in natural evolution. Wired talked with him about the increasingly human-engineered road ahead.



cloning.

problem? no problem.

why all the hype and paranoia about cloning,

asks biophysicist gregory stock.

we're becoming the objects of our own technology,
and we better get used to it.

by roderick simpson



Welcome to Silicorn

Fairfield, Iowa, that is. Home of some of the wily callback companies that broke the back of outrageous overseas phone rates, and that are now turning themselves into virtual phone companies to battle the telco giants.

Fairfield also happens to be ground zero of the transcendental meditation movement in the US.

The two facts are not coincidence.

Valley

By Peter Maass

Photography by
Gabor Ekecs

The plane lands without incident at Chicago's teeming O'Hare International Airport, where everyone's on a mission, going somewhere, doing something. The industrially correct word for such an airport is *hub*, but it's a turnstile more than anything else, flinging us to our diverse destinations: this one goes to Los Angeles, that one to Paris, another to Caracas. Me? I'm going to Iowa. I board a half-empty connecting flight, and an hour later the plane lands in Cedar Rapids. It's the only passenger jet in sight, and it will not stay for long - this plane has places to go.

I get in my rental car and head *away* from Cedar Rapids - far away. I drive a few miles on Interstate 380 and peel off at Route 1, which has one lane going each way - and if I make the mistake of swerving just a tiny bit, I will end up flattened like a bug against the grill of an oncoming 18-wheeler. This is rural territory. There are cornfields all around, an occasional farmhouse with a Ford pickup in front, and modest crossroads sporting the likes of a Dairy Queen and a gas station where the attendant knows most everyone. Traffic congestion is caused not by a scrum of horn-blowing lunatics, but by lone tractors putt-putting along the road, the farmers waving at you as you pass. I drive for an hour, until I reach a marquee-style sign:

Now Showing
FAIRFIELD

A Cast of 10,000 as Themselves
A Story About Excellence
in Community Living

I have reached my destination, but this is all a bit strange. I am working on a high tech story, yet I am not in Silicon Valley, nor in Manhattan's Silicon Alley, nor in Seattle or Boston or any city associated with high tech. I am not even *in* a city, not even close to one, and my hotel is on a dirt road. The companies I seek are located on patches of earth that until recently were cornfields, and that ground - upon which the future of global telecommunications is being sculpted - is surrounded by cornfield upon cornfield upon cornfield.

I have come to Fairfield to interview the high tech entrepreneurs behind Telegroup and USA Global Link, telecommunications firms whose wily use of callback technology helped break the spine of the world's telephone monopolies. The upshot may be as earthshaking in the US\$600 billion global telecom market as the breakup of Ma Bell was in the US market. Consider this: The average cost of an international phone call is poised to drop as much as 80 percent over the next few years. To anyone who has made an international call and cursed its exorbitant cost, these guys are heroes. Their reward has been considerable so far, leading to annual salaries in excess of half a million dollars for some - and the prospect of greater riches ahead.

It started quite modestly a few years back, when callback companies arrived on the scene using a high tech trick to capitalize on the fact that foreign telephone monopolies charge

many times more for international calls than American companies such as AT&T and MCI. The trick consisted of setting up phone switches in the States that customers would call from abroad. Callers would hang up after the first ring, avoiding any charge, and a phone switch would call them back instantly, connecting them to a stateside phone line. The customers then dialed their calls on the American line, incurring reasonable US rates rather than exorbitant rates charged by the foreign monopolies.

Telegroup, which grew from practically nothing a few years ago into a firm that raked in

www.wired.com/ 5.09/callback/

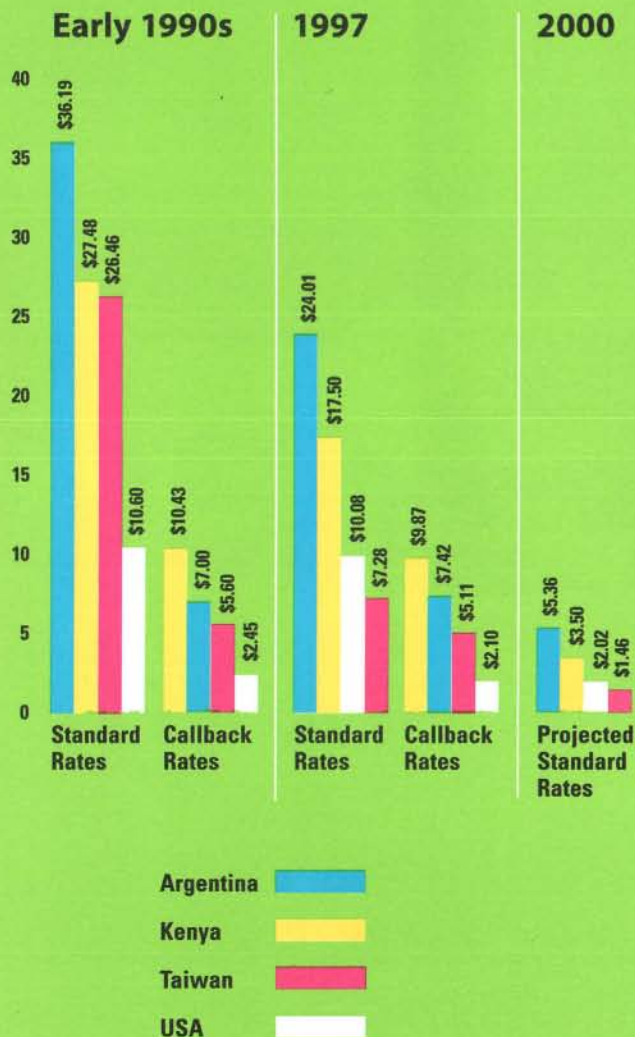


\$213 million in revenues last year, just went public, is valued at about \$300 million, and aims to evolve into a global phone company offering a full range of services. A few cornfields away,

Peter Maass (petermaass@compuserve.com), a writer based in New York, is the author of Love Thy Neighbor: A Story of War, a memoir of his experiences covering the Bosnian war.

Long Distance Free Fall

In the beginning, there were outrageous international phone rates. Each country's telecom authority essentially monopolized phone traffic across its borders, and so these entities often squeezed consumers. Then, beginning in the early 1990s, the scrappy callback firms, among others, started undermining those rates. Below, the dramatic decline in prices between the official telecom rate and the callback rate becomes apparent. Each price is in US dollars and is based on a seven-minute call from the listed country to Australia. Projected rates for 2000 are based on US Trade Representative Charlene Barshefsky's analysis, shared by others, that phone rates will continue their free fall and drop 80 percent off their current price in the next few years. At some point, voice calls may cost next to nothing.



Global Link aims for a similar transition and has unveiled grandiose plans to build an Internet-based phone system. If Telegroup or Global Link stumble during their transitions, they're telecom roadkill. Splat. If they stay on their feet, they're players in an explosion of riches in the warp-speed world of global telephony.

Yes, Fairfield is hot these days. The locals call it Silicorn Valley.

Just prior to my visit, Telegroup had opened a new headquarters building, an attractive structure that stands out amid the area's grain silos because it's topped with Buddhist-style spires. Yes, it looks a bit odd, and it makes you wonder. Staff is still feeling its way around the place when I visit, and workers rumble down the corridors girded with tool belts and wielding power drills, providing low tech solutions for a high tech company. The company has that unmistakable Silicon Valley feel - the casual dress, the sea of young faces, the absence of corporate rigidity, the we-are-building-a-new-world atmosphere.

I head toward the office of Fred Gratzon, the wizard of this Oz. As chair of Telegroup, he pulled down \$850,000 in salary and bonuses last year and owns a big chunk of the firm. His clothes are Eddie Bauer-ish, he wears leather slippers, and he has the endearing manner of an ice-cream vendor - which he used to be. Sales tags still hang from underneath his office chairs, and a picture of a familiar-looking Indian guru is propped against a wall. There's something rather special about this office, but a first-time visitor might need some time to piece it together. Because Telegroup's growth has been so fast and hectic, Gratzon hasn't had time to arrange the stuff in his new office, and I jokingly ask how long it will be before he needs to move into a bigger one. "No more than a year," he replies, and he is not fooling around. "We play seriously, we play to win, and we'll be successful. But

one of the secrets of our success is to not take it so seriously." There's a Zen-like contradiction in him and in his company, an unusual calmness/earnestness. It has something to do with those spires atop the roof and the picture of the guru on his wall, but that's getting ahead of the story.

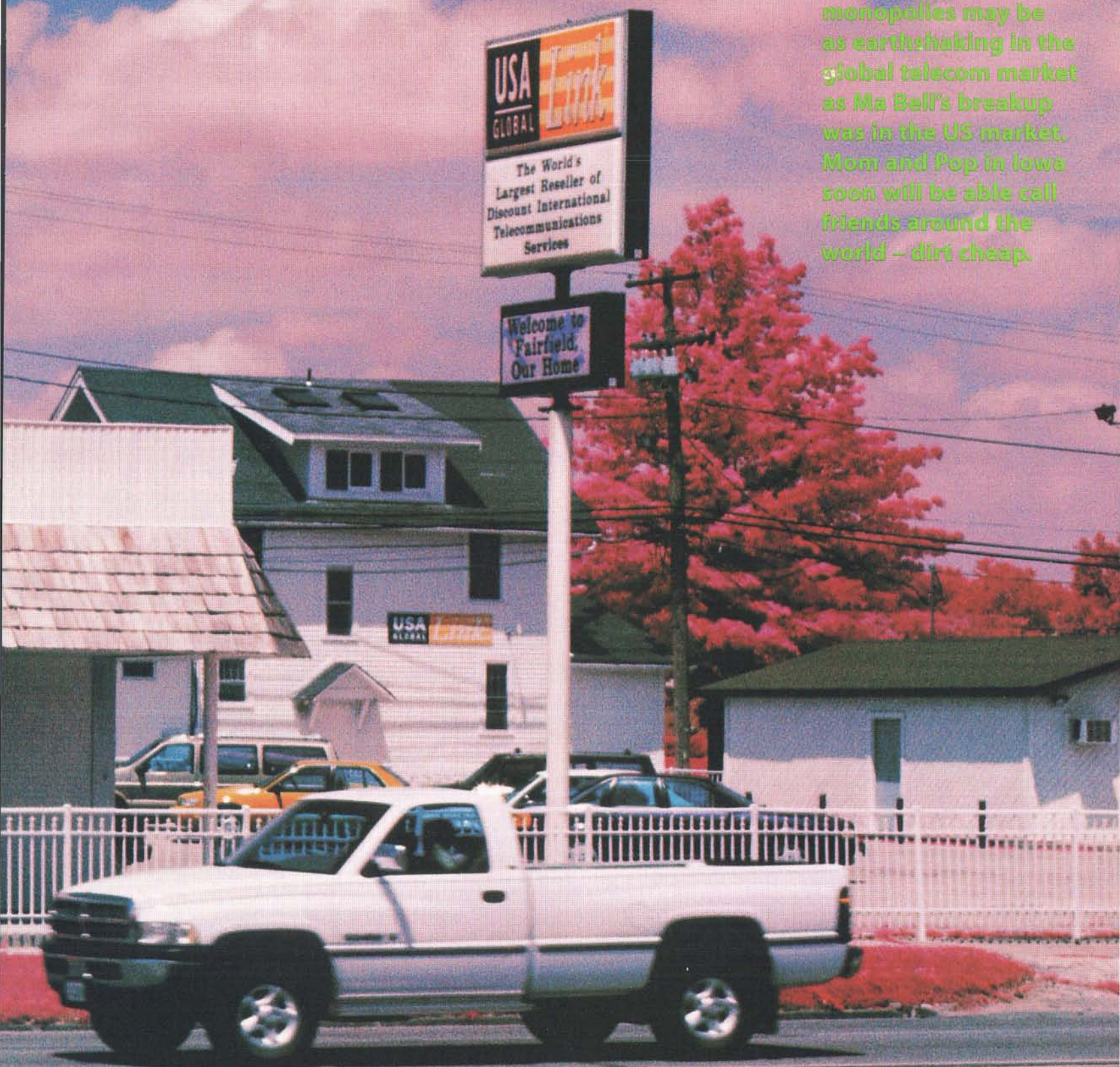
Gratzon has had the sort of business career that would be defined in a résumé as "wide ranging." More than a decade ago he set up the Great Midwestern Ice Cream Company, which did quite well for a while, earning a couple of culinary prizes - and Nancy Reagan even invited him to cater a White House picnic after she tasted his product. Gratzon took on new investors, but they booted him from the firm in 1988, leaving him to collect unemployment checks and worry about how to support his family in Fairfield.

This guy is no farmer, so he began fiddling around in the phone industry, buying blocks of discounted long distance time from AT&T and reselling bits and pieces to friends. Working out of a spare room of his house, he teamed up with fellow Fairfield resident Cliff Rees, a successful oil trader with an arbitrageur's acute, go-for-the-kill mind-set. Thus was Telegroup born.

Gratzon and Rees stumbled into callback in 1992 after reading a magazine article about the infant technology. "Callback is an arbitrage play," Rees says calmly, as though remarking on the weather. His office boasts a number of unusual artifacts, including two samurai swords and his grandfather's cavalry blade on a display case, a wall-sized world map, and a statuette of Lakshmi, the Hindu goddess of wealth. Rees, president and CEO of Telegroup, explains arbitrage as finding price imbalances and exploiting them with whatever weapons you have - callback technology, for instance.

In the early 1990s, callback's commercial potential was vast. The new callback firms in Iowa and other states aggressively marketed it and underpriced the

The upshot of today's breakdown of the world's telephone monopolies may be as earthshaking in the global telecom market as Ma Bell's breakup was in the US market. Mom and Pop in Iowa soon will be able call friends around the world - dirt cheap.

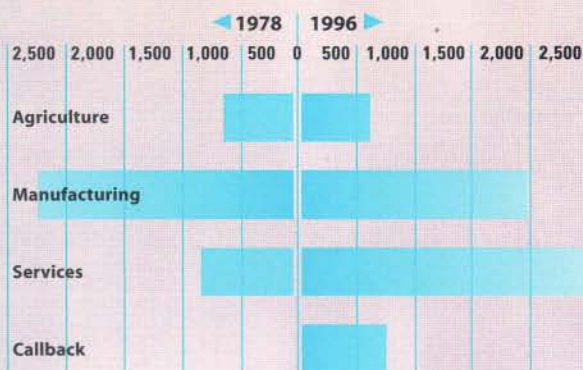


Location, location, location?

All the world's businesses spend more on telecommunications each year than they do on oil. The global telecom market is US\$600 billion, and it is estimated that this figure will double or triple in the next decade. But although deciding where to build an oil refinery is dictated by geography, a global telecommunications company can be set up almost anywhere. You can start one up far from the coastal ports, deep in the heartland – even as far away as, say, Iowa. And that's exactly where Telegroup Inc. and USA Global Link Inc., two wily callback firms, made their start – Fairfield, Iowa.

Fairfield's economy, like the world's economy, has shifted over the years. Even though the town is surrounded by cornfields, the slice of its labor force devoted to agriculture has shrunk. Just as the ranks of agricultural laborers were gutted after the agrarian age, the number of industrial-age workers has declined as the manufacturing sector has shrunk. But workers in the information age's virtual industries – like those in the service sector – have proliferated. That's particularly true in the local callback firms. The number of callback workers in Fairfield has surged from zero to 750 in just the last few years.

Number of Workers in Jefferson County, Iowa*



Sources: Iowa Workforce Development, Labor Market Information Bureau; US Department of Labor, Bureau of Labor Statistics; Telegroup Inc.; USA Global Link Inc.

*Figures for Jefferson County, rather than Fairfield alone, are listed, since the town's statistics are incomplete and do not differ significantly from the county's tallies.



big guys by margins that were tempting for individuals and small companies – the sort of customers who feel the pain of high phone rates more acutely than large firms (although the US State Department, the United Nations, and the World Bank reportedly used callback). This ignited a somewhat amusing yet momentous war in which foreign telephone monopolies tried to crush the callback upstarts. They failed, and the world will never be the same again.

Estimates of the magnitude of today's callback market vary, but most guesses converge at about \$1.5 billion in 1996, and the market is believed to have

Ditto for most other countries; rates varied but almost always bore little relation to the PTT's cost of completing the call. They charged as much as they could get away with. It was a racket.

Things began changing in 1992 and 1993, when callback hit its stride. At the start, some PTTs were confused – they knew that callback firms were stealing their business but they didn't quite understand how. One day, a Global Link salesperson in Spain got a visit from several officials of the Spanish PTT who – expecting a switching system of some sort – were surprised to find nothing more than a telephone

to a US government tally. The European Union, a bit more subtle, imposed a punitive value-added tax on callback firms. Most crucially, PTTs blocked telephone numbers used by callback firms; if you tried to dial a callback firm's number in the US from, say, Paris or Jakarta, you'd get a busy signal.

Like clever mice outwitting fat cats, the callback firms prevailed by changing their numbers as soon as they were blocked. The PTTs were not amused. Instead of using a flyswatter, they took out a hammer and blocked three-digit exchanges within an area code – for example, every number in the 212 area code beginning with 864. The callback firms just laughed, changed their numbers to different exchanges, notified customers of the new numbers, and carried on.

So then the PTTs blocked *those* exchanges, and, of course, the callback firms just hopped to other ones, and so on. In one case, a callback firm, hounded by Uruguay's PTT, acquired the same three-digit exchange as Uruguay's embassy in Washington, DC. The PTT was trumped: if it blocked the exchange, the country's embassy would be cut off from the motherland.

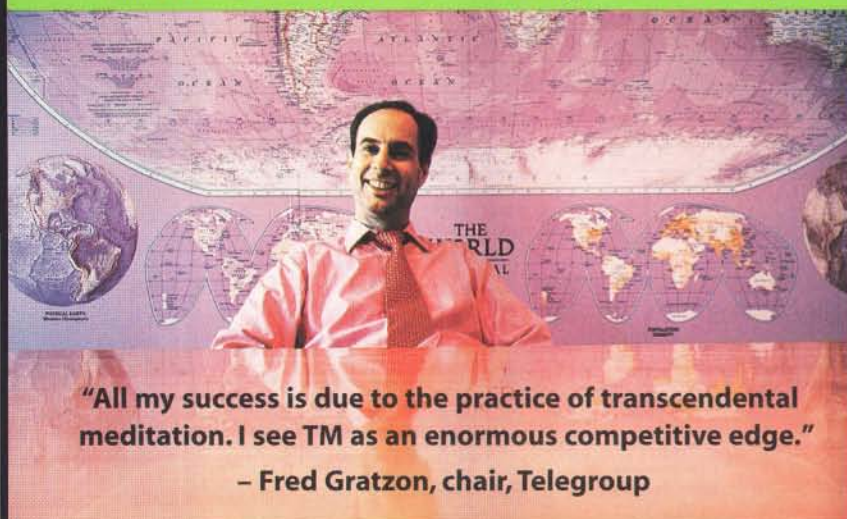
Some PTTs – mostly in the Third World – abandoned the hammer and used the shotgun, blocking calls to entire area codes. This had two results: callback firms changed numbers to different area codes, and the PTTs were inundated with complaints from customers who couldn't call their friends in, say, Seattle.

The game became increasingly sophisticated. Realizing call blocking wasn't working too well, some of the PTTs blocked tone dialing after calls from the US were connected, thus making it impossible for callback customers to use their touch-tone phones to communicate with the callback computer switches (or for traveling

businesspeople to access their voicemail back home). The callback firms got around this barrier by using voice-recognition software to complete the calls: instead of dialing numbers, customers pronounced them aloud. Some firms used a particularly nifty device to turn the trick – a human operator. The cat-and-mouse permutations took on myriad forms, but in each case the mice came out on top.

"Some of the callback operators proved rather ingenious," admits Jonathan Nadler, an attorney for Squire, Sanders & Dempsey, which represents a consortium of Central and South American telcos. He acknowledges that the economic incentive for callback firms is quite strong. "It's classic arbitrage," he said. "It doesn't cost anything to be in the business. You buy a cheap switch, you make no contribution to the infrastructure, you don't pay taxes in the country where you're providing the service. It's a great party as long as it lasts, with the one problem being that the party is not necessarily a legal one in a lot of countries."

To make matters worse for the PTTs, late last year AT&T rolled out its own callback service, which was like a trusted ally defecting to the other side. For a variety of reasons, AT&T had long resisted callback technology and had even asked the FCC to crack down on callback firms operating in the US. (The agency refused.) For one, when a PTT transmits a call to America, it can channel the call through any US carrier line. It is supposed to do this proportionally – if AT&T transmits 60 percent of calls *from* the US, then it should get 60 percent of calls *to* the States. But if a PTT got miffed at AT&T for some reason – say, because AT&T was operating a callback service or failing to stand in the way of callback services – the PTT could reduce or threaten



"All my success is due to the practice of transcendental meditation. I see TM as an enormous competitive edge."

– Fred Gratzon, chair, Telegroup

doubled annually since 1992. It didn't take long for foreign, government-run telcos – known in the industry by the initials PTT (Post, Telephone, and Telegraph) – to realize that they were losing valuable business and that the hemorrhaging would worsen unless something was done.

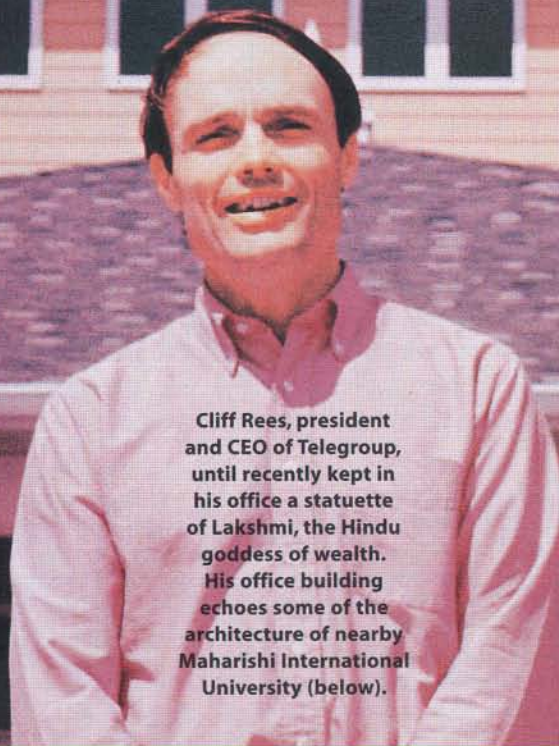
Basically, international calls have been a glorious cash cow for the PTTs since the dawn of telecom time; until recently, the PTTs faced no competitive pressures and could charge whatever infernal rate they wanted. It was like harvesting cash. A call from Buenos Aires to Miami, for example, would cost \$5-\$6 per minute for a minimum of three minutes.

and a fax machine. In fact, the switches were located in the US, and the salesperson was merely signing up customers for Global Link's service, giving them the callback numbers in the US, and faxing their account information to headquarters in Iowa.

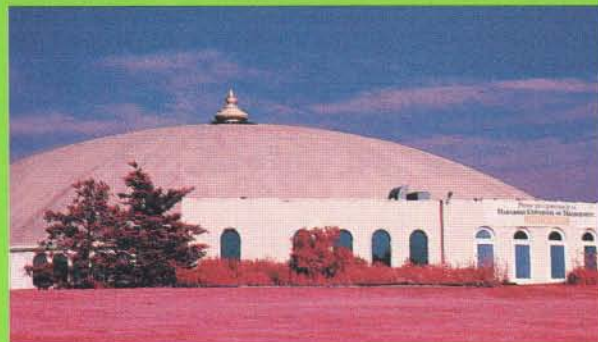
The PTTs – and the governments that operated them – got wise to the system and decided to crush it. A number of countries took legislative action – the Bahamian Parliament passed a law authorizing a \$10,000 fine for anyone they caught using callback services (\$20,000 and a two-year jail term for a second conviction), and 26 other countries have prohibited callback, according

The TM connection:

More than one-third of Fairfield's residents are devout meditators, including the senior executives at Telegroup and Global Link, and most of their employees.



Cliff Rees, president and CEO of Telegroup, until recently kept in his office a statuette of Lakshmi, the Hindu goddess of wealth. His office building echoes some of the architecture of nearby Maharishi International University (below).



to reduce the calls channeled through AT&T lines, thus diminishing AT&T's revenue. Even so, AT&T realized last year that in some markets callback's pros outweigh the cons, and it switched sides. Despite the high tech wizardry of global telecommunications, sometimes business decisions boil down to a very old motto: If you can't beat 'em, join 'em.

With the sky falling in, the foreign telcos began reacting in strange ways. Indosat, the international arm of Indonesia's government-controlled PTT, invested Rp4.68 billion (\$20 million) in Global Link last year, even though an Indonesian government decree bans the use of callback. Others emulated this schizophrenic strategy. "I remember going to trade conferences, and PTTs would ask, 'What is call reorigination?'" says Joel Eisenberg, chair of Seattle-based International Telcom, one of the first callback firms. "Then, they asked how they stop it, and now they want to get on the gravy train."

The PTTs weren't just swatting at the callback firms - they had other forces to contend with. They were being pinched by international calling-card services, such as the one AT&T operates. The company's service allows cardholders in foreign countries to get international AT&T lines by dialing local access numbers. The service is similar to callback, but the calls can be made only in countries where AT&T (or any company offering the service) has local access numbers, and the rates are generally more expensive than callback.

Then there was the growing practice of reselling international line time, which enabled competitors of the PTTs to purchase international line time from foreign carriers and offer international service at lower rates. Most powerfully, a trend toward privatization was creeping across the globe, which meant that foreign governments faced new pressure to open their markets to competition, especially in the hyper-protected realm of telecommunications.

The end of the ancien régime came on February 15 of this year, when 68 countries agreed in Geneva to open their telecommunications markets in 1998. The agreement, under the auspices of the World Trade Organization, marks a new era in telecommunications, according to industry and government officials. US Trade Representative Charlene Barshefsky predicts that the \$600 billion global telecommunications market will double or treble in the next decade, and few experts dispute her 182 ►

CIVIL RITES

In 1964, artist Romare Bearden took a bag of photos into the New York headquarters of Spiral, a newly formed group of fellow African-American artists, and poured the clippings on the floor.

Bearden told the artists gathered there that he had an idea: a mural that would illustrate black experience against the backdrop of the civil rights movement. The resulting series, *Projections*, captured the daily rites of African-American life and catapulted Bearden into the top ranks of American artists.

In *The Dove* (shown), part of an exhibition now winding its way through the US, Bearden demonstrates his influence.

"He was a master at portraying people at the rituals of life and raising those rituals to a higher level," says Dorothe Rohan Dow of The Romare Howard Bearden Foundation. Bearden died in 1988.

— Ben Patterson

Ben Patterson is a research intern at Wired.

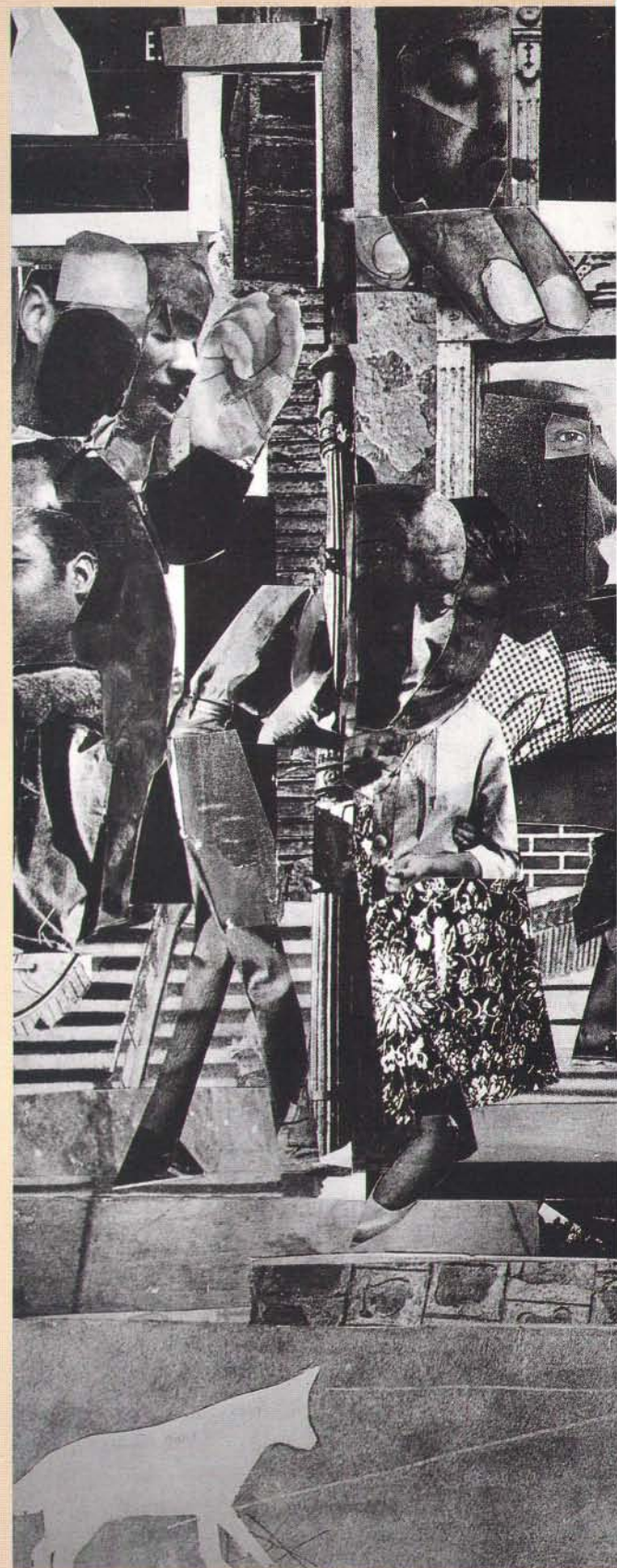




PHOTO: © ROMARE HOWARD BEARDEN FOUNDATION/LICENSED BY VAGA, NEW YORK, NY

Embrace dumb power

Success is nonlinear

More gives more

Anticipate the cheap

Let go at the top

Make virtuous circles

By Kevin Kelly

New Rules for the

Twelve dependable principles

The Digital Revolution gets all the headlines these days. But turning slowly beneath the fast-forward turbulence, steadily driving the gyrating cycles of cool technogadgets and gotta-haves, is a much more profound revolution – the Network Economy.

This emerging new economy represents a tectonic upheaval in our commonwealth, a social shift that reorders our lives more than mere hardware or software ever can. It has its own distinct opportunities and its own new rules. Those who play by the new rules will prosper; those who ignore them will not.

The advent of the new economy was first noticed as far back as 1969, when Peter Drucker perceived the arrival of knowledge workers. The new economy is often referred to as the Information Economy, because of information's superior role (rather than material resources or capital) in creating wealth.

I prefer the term Network Economy, because *information* isn't enough to explain the discontinuities we see. We have been awash in a steadily increasing tide of information for the past century. Many successful knowledge businesses have been built on information capital, but only recently has a total reconfiguration of information itself shifted the whole economy.

The grand irony of our times is that the era of computers is over. All the major consequences of stand-alone computers have already taken place. Computers have speeded up our lives a bit, and that's it.

In contrast, all the most promising technologies

making their debut now are chiefly due to communication between computers – that is, to connections rather than to computations. And since communication is the basis of culture, fiddling at this level is indeed momentous.

And fiddle we do. The technology we first invented to crunch spreadsheets has been hijacked to connect our isolated selves instead. Information's critical rearrangement is the widespread, relentless act of connecting everything to everything else. We are now engaged in a grand scheme to augment, amplify, enhance, and extend the relationships and communications between all beings and all objects. That is why the Network Economy is a big deal.

The new rules governing this global restructuring revolve around several axes. First, wealth in this new regime flows directly from innovation, not optimization; that is, wealth is not gained by perfecting the known, but by imperfectly seizing the unknown. Second, the ideal environment for cultivating the unknown is to nurture the supreme agility and nimbleness of networks. Third, the domestication of the unknown inevitably means abandoning the highly successful known – undoing the perfected. And last, in the thickening web of the Network Economy, the cycle of “find, nurture, destroy” happens faster and more intensely than ever before.

The Network Economy is not the end of history. Given the rate of change, this economic arrangement may not endure more than a generation or two. Once

The net wins

Significance precedes momentum

Don't solve problems

Follow the free

Feed the web first

Seek disequilibrium

www.wired.com/5.09/networkeconomy/

New Economy ▶

for thriving in a turbulent world ▶

networks have saturated every space in our lives, an entirely new set of rules will take hold. Take these principles, then, as rules of thumb for the interim.

1 The Law of Connection

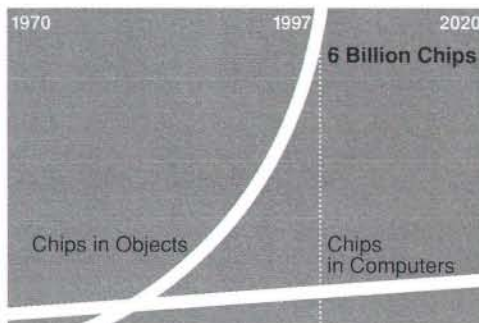
Embrace dumb power

The Network Economy is fed by the deep resonance of two stellar bangs: the collapsing microcosm of chips and the exploding telecosm of connections. These sudden shifts are tearing the old laws of wealth apart and preparing territory for the emerging economy.

As the size of silicon chips shrinks to the microscopic, their costs shrink to the microscopic as well. They become cheap and tiny enough to slip into every – and the key word here is *every* – object we make. The notion that all doors in a building should contain a computer chip seemed ludicrous 10 years ago, but now there is hardly a hotel door without a blinking, beeping chip. Soon, if National Semiconductor gets its way, every FedEx package will be stamped with a disposable silicon flake that smartly tracks the contents. If an ephemeral package can have a chip, so can your chair, each book, a new coat, a basketball. Thin slices of plastic known as smart cards hold a throwaway chip smart enough to be your banker. Soon, all manufactured objects, from tennis shoes to hammers to

lamp shades to cans of soup, will have embedded in them a tiny sliver of thought. And why not?

The world is populated by 200 million computers. Andy Grove of Intel happily estimates that we'll see 500 million of these by 2002. Yet the number of non-computer chips now pulsating in the world is 6 billion! They are already embedded in your car and stereo and rice cooker. Because they can be stamped out fast and cheap, like candy gumdrops, these chips are known in the industry as "jelly beans." And we



SOURCE: DATAQUEST

We are moving from crunching to connecting. While the number of computer chips is rising, the number of chips in objects other than computers is rising faster. When these myriad low-power chips are connected, we get very powerful results.

are in the dawn of a jelly bean explosion: there'll be 10 billion grains of working silicon by 2005, a billion not long after. Someday each of them may be as smart as an ant, dissolved into our habitat.

As we implant a billion specks of our thought into everything we make, we are also connecting them up. Stationary objects are wired together. The nonstationary rest – that is, most manufactured objects – will be

Kevin Kelly (kk@well.com) is *Wired's* executive editor.

linked by infrared and radio, creating a wireless web vastly larger than the wired web. It is not necessary that each connected object transmit much data. A tiny chip plastered inside a water tank on an Australian ranch transmits only the telegraphic message of whether it is full or not. A chip on the horn of each steer beams out his pure location, nothing more: "I'm here, I'm here." The chip in the gate at the end of the road communicates only when it was last opened: "Tuesday."

The glory of these connected crumbs is that they don't need to be artificially intelligent. Instead, they work on the dumb power of a few bits linked together. Dumb power is what you get when you network dumb nodes into a smart web. It's what our brains do with dumb neurons and what the Internet did with dumb personal computers. A PC is the conceptual equivalent of a single neuron housed in a plastic case. When linked by the telecosm into a neural network, these dumb PC nodes created that fabulous intelligence called the World Wide Web. It works in other domains: dumb parts, properly connected, yield smart results.

A trillion dumb chips connected into a hive mind is the hardware. The software that runs through it is the Network Economy. A planet of hyperlinked chips emits a ceaseless flow of small messages, cascading into the most nimble waves of sensibility. Every farm moisture sensor shoots up data, every weather satellite beams down digitized images, every cash register spits out bit streams, every hospital monitor trickles out numbers, every Web site tallies attention, every vehicle transmits its location code; all of this is sent swirling into the web. That tide of signals is the net.

The net is not just humans typing at each other on AOL, although that is part of it too and will be as long as seducing the romantic and flaming the idiotic are enjoyable. Rather, the net is the collective interaction spun off by a trillion objects and living beings, linked together through air and glass.

This is the net that begets the Network Economy. According to MCI, the total volume of voice traffic on global phone systems will be superseded by the total volume of data traffic in three years. We're already on the way to an expanded economy full of new participants: agents, bots, objects, and machines, as well as several billion more humans. We won't wait for AI to make intelligent systems; we'll do it with the dumb power of ubiquitous computing and pervasive connections.

The whole shebang won't happen tomorrow, but the trajectory is clear. We are connecting all to all. Every step we take that banks on cheap, rampant, and universal connection is a step in the right direction. Furthermore, the surest way to advance massive connectionism is to exploit decentralized forces – to link the distributed bottom. How do you make a better bridge? Let the parts talk to each other. How do you improve lettuce farming? Let the soil speak to the farmer's tractors. How do you make aircraft safe?

Let the airplanes communicate among themselves and pick their own flight paths.

In the Network Economy, embrace dumb power.

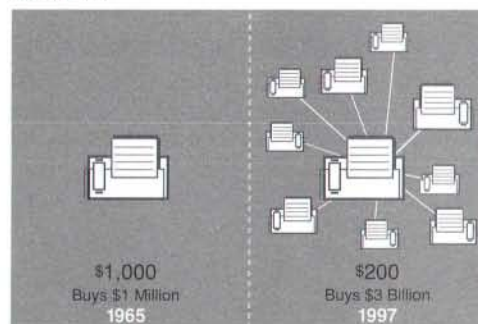
2 The Law of Plentitude

More gives more

Curious things happen when you connect all to all. Mathematicians have proven that the sum of a network increases as the square of the number of members. In other words, as the number of nodes in a network increases arithmetically, the value of the network increases exponentially. Adding a few more members can dramatically increase the value for all members.

Consider the first modern fax machine that rolled off the conveyor belt around 1965. Despite millions of dollars spent on its R&D, it was worth nothing. Zero. The second fax machine to roll off immediately made the first one worth something. There was someone to fax to. Because fax machines are linked into a network, each additional fax machine sliding down the chute increases the value of all the fax machines operating before it.

So strong is this network value that anyone purchasing a fax machine becomes an evangelist for the fax network. "Do you have a fax?" fax owners ask you. "You should get one." Why? Your purchase increases the worth of their machine. And once you join the network, you'll begin to ask others, "Do you have a fax (or email, or Acrobat software, etc)?" Each additional account you can persuade onto the network substantially increases the value of your account.



The high price of the first modern fax machine, circa 1965, bought you one end of a communications device. The low price of a fax machine today buys you an entire network consisting of 18 million machines. Each additional unit sold increases the value of your machine.

When you go to Office Depot to buy a fax machine, you are not just buying a US\$200 box. You are purchasing for \$200 the entire network of all other fax machines and the connections between them – a value far greater than the cost of all the separate machines.

The fax effect suggests that the more plentiful things become, the more valuable they become. But this notion directly contradicts two of the most fundamental axioms we attribute to the industrial age.

First hoary axiom: Value came from scarcity; diamonds, gold, oil, and college degrees were precious because they were scarce.

Second hoary axiom: When things were made plentiful, they became devalued; carpets no longer

indicated status when they could be woven by the thousands on machines.

The logic of the network flips these industrial lessons upside down. In a Network Economy, value is derived from plentitude, just as a fax machine's value increases in ubiquity. Power comes from abundance. Copies (even physical copies) are cheap. Therefore, let them proliferate.

Instead, what is valuable is the scattered relationships – sparked by the copies – that become tangled up in the network itself. And the relationships rocket upward in value as the parts increase in number even slightly. Windows NT, fax machines, TCP/IP, GIF images, RealAudio – all born deep in the Network Economy – adhere to this logic. But so do metric wrenches, triple-A batteries, and other devices that rely on universal standards; the more common they are, the more it pays you to stick to that standard.

In the future, cotton shirts, bottles of vitamins, chain saws, and the rest of the industrial objects in the world will also obey the law of plentitude as the cost of producing an additional copy of them falls steeply, while the value of the network that invents, manufactures, and distributes them increases.

In the Network Economy, scarcity is overwhelmed by shrinking marginal costs. Where the expense of churning out another copy becomes trivial (and this is happening in more than software), the value of standards and the network booms.

In the Network Economy, more gives more.

3 The Law of Exponential Value Success is nonlinear

The chart of Microsoft's cornucopia of profits is a revealing graph because it mirrors several other plots of rising stars in the Network Economy. During its first 10 years, Microsoft's profits were negligible. Its profits rose above the background noise only around 1985. But once they began to rise, they exploded.

Federal Express experienced a similar trajectory: years of minuscule profit increases, slowly ramping up to an invisible threshold, and then surging skyward in a blast sometime during the early 1980s.

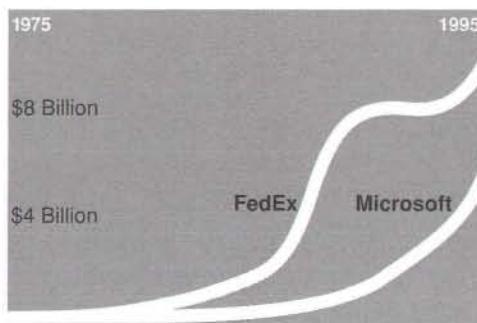
The penetration of fax machines likewise follows a tale of a 20-year overnight success. Two decades of marginal success, then, during the mid-1980s, the number of fax machines quietly crosses the point of no return – and the next thing you know, they are irreversibly everywhere.

The archetypical illustration of a success explosion in a Network Economy is the Internet itself. As any old-time nethead will be quick to lecture you, the Internet was a lonely (but thrilling!) cultural backwater for two decades before it hit the media radar. A graph of the number of Internet hosts worldwide, starting in the 1960s, hardly creeps above the bottom line. Then, around 1991, the global tally of hosts suddenly mushrooms, exponentially arcing up to take over the world.

Each of these curves (I owe *Net Gain* author John Hagel credit for these four examples) is a classic template of exponential growth, compounding in a nonlinear way. Biologists know about exponential growth; such curves are almost the definition of a biological system. That's one reason the Network Economy is often described more accurately in biological terms. Indeed, if the Web feels like a frontier, it's because for the first time in history we are witnessing *biological* growth in *technological* systems.

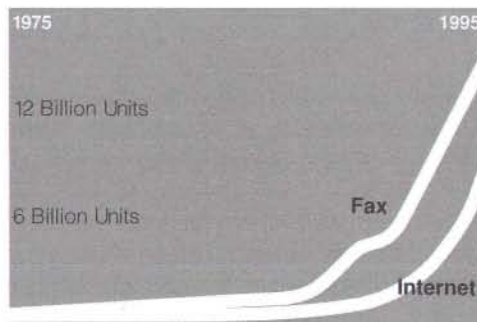
At the same time, each of the above examples is a classic model of the Network Economy. The compounded successes of Microsoft, FedEx, fax machines, and the Internet all hinge on the prime law of networks: value explodes exponentially with membership, while this value explosion sucks in yet more members. The virtuous circle inflates until all potential members are joined.

The subtle point from these examples, however, is



SOURCE: NET GAIN

While exerting constant effort over time, Microsoft and FedEx experience small gains for a long incubation period while their networks are being seeded. Once the network is established, profits boom. They can disappear just as quickly. We see the same effect in total numbers of fax machines and Internet hosts. Their rise does not follow the steady rise of linear growth. Instead, there is little growth at the beginning, despite a lot of foundational work, followed by explosive growth with relatively little additional genius.



SOURCE: NET GAIN

that this explosion did not ignite until approximately the late 1980s. Something happened then. That something was the dual big bangs of jelly bean chips and collapsing telco charges. It became feasible – that is, dirt cheap – to exchange data almost anywhere, anytime. The net, the grand net, began to nucleate. Network power followed.

Now that we've entered the realm where virtuous circles can unfurl overnight successes in a biological way, a cautionary tale is in order. One day, along the beach, tiny red algae blooms into a vast red tide. Then, a few weeks later, just when the red mat seems indelible, it vanishes. Lemmings boom and disappear. The same biological forces that amplify populations can mute them. The same forces that feed on each other to amplify network presences into powerful overnight standards can also work in reverse to unravel them in a blink. Small beginnings can lead

to large results, while large disturbances have only small effects.

In the Network Economy, success is nonlinear.

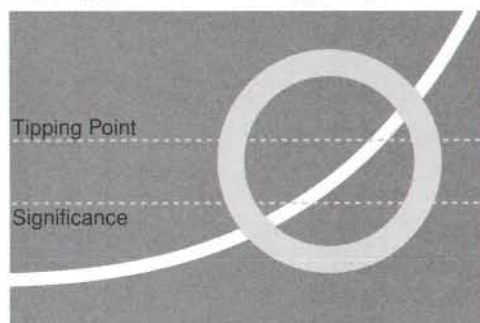
4 The Law of Tipping Points

Significance precedes momentum

There is yet one more lesson to take from these primeval cases of the Network Economy. And here, another biological insight will be handy. In retrospect, one can see from these expo-curves that a point exists where the momentum was so overwhelming that success became a runaway event. Success became infectious, so to speak, and spread pervasively to the extent that it became difficult for the uninfected to avoid succumbing. (How long can you hold out not having a phone?)

In epidemiology, the point at which a disease has infected enough hosts that the infection moves from local illness to raging epidemic can be thought of as the tipping point. The contagion's momentum has tipped from pushing uphill against all odds to rolling downhill with all odds behind it. In biology, the tipping points of fatal diseases are fairly high, but in technology, they seem to

During the exponential gains peculiar to networks, compounding effects can pass a point of runaway growth. But by then it's too late to take full advantage. It's before this point, before momentum builds, that one needs to pay attention.



trigger at much lower percentages of victims or members.

There has always been a tipping point in any business, industrial or network, after which success feeds upon itself. However, the low fixed costs, insignificant marginal costs, and rapid distribution that we find in the Network Economy depress tipping points below the levels of industrial times; it is as if the new bugs are more contagious – and more potent. Smaller initial pools can lead to runaway dominance.

Lower tipping points, in turn, mean that the threshold of significance – the period before the tipping point during which a movement, growth, or innovation must be taken seriously – is also dramatically lower than it was during the industrial age. Detecting events while they are beneath this threshold is essential.

Major US retailers refused to pay attention to TV home-shopping networks during the 1980s because the number of people watching and buying from them was initially so small and marginalized that it did not meet the established level of retail significance. Instead of heeding the new subtle threshold of network economics, the retailers waited until the alarm of the tipping point sounded, which meant, by definition, that it was too late for them to cash in.

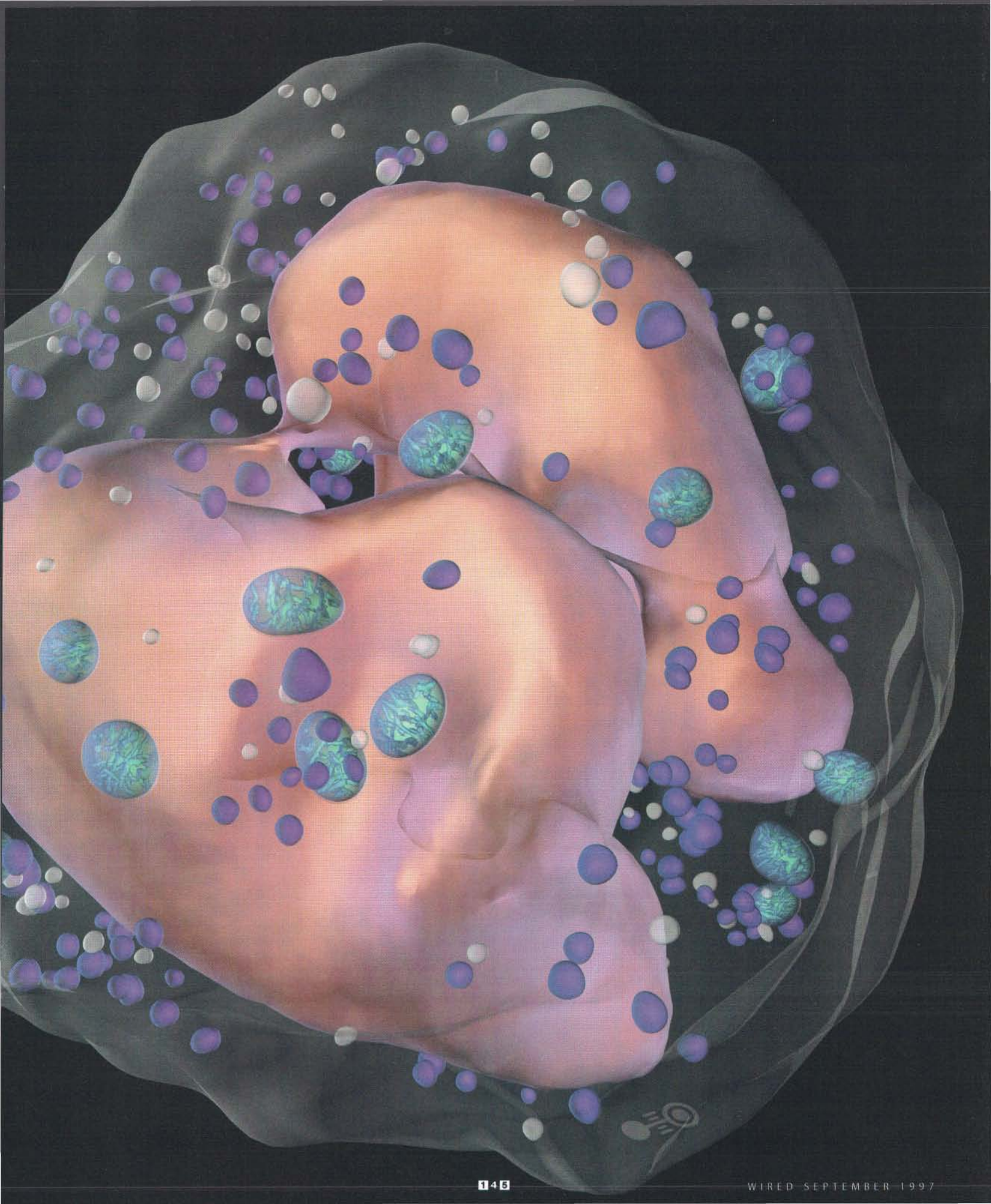
In the past, an innovation's momentum indicated significance. Now, in the network environment, 186 ►

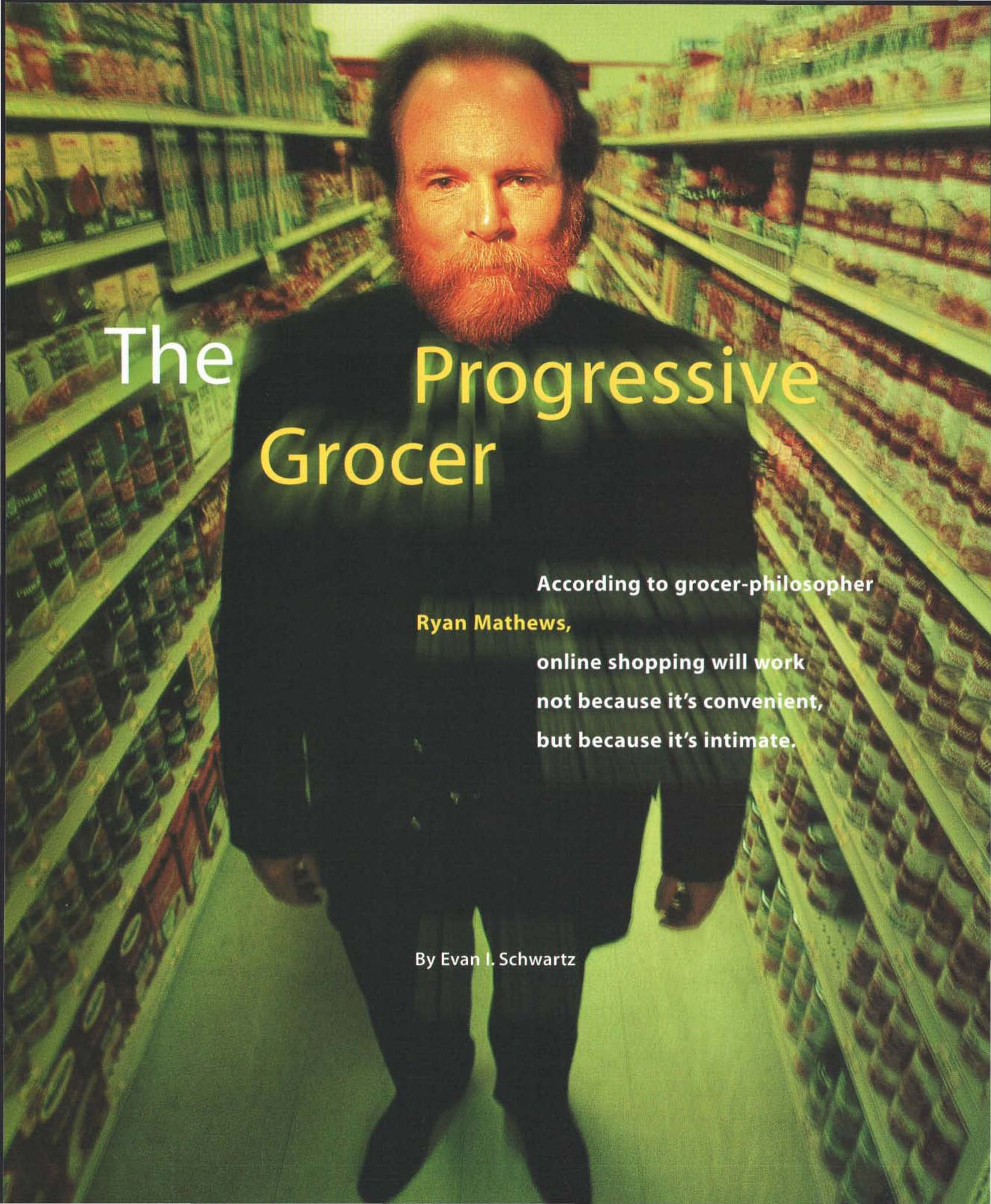
Soft Cell

Remember *Fantastic Voyage*, the 1966 movie in which a microscopic medical team journeys through a human body fending off attacks from marauding white blood cells? Well here's the (almost) real thing: a neutrophil that's been sliced with a diamond knife into two dozen submicron sections, scanned by an electron microscope, then digitally reassembled in 3-D color. (The result is shown here at 37,000-power magnification.)

There is a reason behind this precision: it's part of the Cell Visualization Project run by Kenneth Eward of New York-based BioGrafx and supported as an educational tool by the National Institutes of Health. The goal? To put fully maneuverable cell fly-throughs on the Net. – Spencer Reiss

Spencer Reiss is a features editor at Wired.



A full-page photograph of a man with a thick, dark beard and mustache, wearing a dark jacket, standing in the center of a grocery store aisle. He is looking directly at the camera. The aisle is lined with shelves filled with various canned goods, primarily soups, on both sides. The lighting is warm and slightly dim, creating a sense of intimacy.

The Progressive Grocer

According to grocer-philosopher
Ryan Mathews,
online shopping will work
not because it's convenient,
but because it's intimate.

By Evan I. Schwartz

Wired: Everyone needs to shop for groceries. Does anyone enjoy it?

Mathews: No. People think of shopping for groceries as slightly more pleasant than a root canal. It's always at the bottom of the list of people's everyday activities. But isn't it a tribal thing that's been happening for centuries, whether we like it or not?

In parts of the world, even in parts of America, it still is a very tribal thing. In New Orleans, it's a tradition for African-American women to get all dressed up on Saturday and take cabs to meet each other socially in the produce department. In more traditional cultures, food is an expression of personal and communal values.

How did it move away from being a social activity into becoming a chore?

In mainstream Anglo culture, we chase calories of convenience. As modern, suburban America evolved, food became much more functional. And the more functional it became, the less of a place it had in people's lives. People quit eating together. As the pace of life accelerated, everyone went off in all kinds of directions. Food has become a casualty of 20th-century complexity.

Can online grocery services reverse this trend?

In a way, yes, because shopping can become interactive again. From an anthropological model, shopping in the physical world is a passive experience. The grocer puts the product on the shelf. I wander through and remove it. It's solitary, monastic. No one anticipates my needs. No one recognizes me as an individual.

In the virtual world, I leave footprints. You know who I am. You know how I navigated the purchase path. The ability to re-establish intimacy is self-evident.

Where's the benefit to the consumer?

A virtual grocer should anticipate my needs better than a physical grocer. For a philosophical model, go back to Socrates' confrontation at the temple of Delphi where the Oracle carved "Know thyself." Virtual shopping is about getting total knowledge of a person, in a way that actually lets that person know themselves better.

So, what will virtual shopping of the future look like?

The virtual grocers will have done their data mining. If, say, I have previously purchased significant numbers of Earth-friendly products, they'll send me an email: "Ryan, we've added 10 green products this week you might be interested in." Because they've profiled me, it will expand the range of products they can sell me. The process becomes my intelligent purchasing agent.

And the consumer will enjoy this?

Absolutely. It saves you time, it knows what you want. It also brings you an element of serendipity.

Is anyone doing this today?

Not really. What's being destroyed in the modern retail

world is any sense of intimacy. If you look at the supermarket of 1920, the grocer knew who you were, what day you got paid, how many kids you had, whether you were a drunk or a gambler – whatever. He fed your family. And he hired your kid to deliver the products. So you had complete customer knowledge and home delivery. Now, we're coming full cycle.

So, we're using advanced technology to demassify the experience and go back to basics.

Yes. I have a good friend in Michigan who has one store. Inside, he has 26 computers. When I asked him why, he said, "So I can know my customer as well as my grandfather did."

How are people using current online grocery services?

The traditional view was that online shopping would be great for pantry replenishment

– paper towels, dog food, laundry detergent, those kinds of items. But at Peapod, the online ordering service that started in Chicago, the Number One item is bananas. The reason? If you look at the profile of average Peapod customers, they are late Xers or young boomers who don't know how to pick fruit. Boomers didn't take their children grocery shopping. So, perishables have done much better online.

Is Peapod the best model? It seems to be losing a fortune by automating the shopping experience: employees go down the supermarket aisles, pick out the food, and deliver it to you at a higher cost.

Peapod is stuck in a certain paradox. The more successful they are, the more money they lose. Being tied to a physical store is self-limiting. The ultimate success of all these services will be as a media, not as a shopping service. The important part is gathering the algorithms about decision-making in the virtual world.

We have less than 1 percent of the population online grocery shopping now. Where are we headed?

It may take five more years to get an effective national model. Then, it will snowball. Demographics favor the virtual shopping experience. Aging boomers will be physically less capable of carrying heavy loads. Also, consider the generation growing up now. I can't conceive of my daughter, who learned to write on a Mac when she was 18 months old, lugging home Tide.

What will happen to the megasupermarkets?

They are a one-stop shopping strategy that will fail over time. But they'll become great places to hold square dances. ■ ■ ■

After earning a master's degree in philosophy, Ryan Mathews faced two choices: teach or be unemployed. Instead, he became a food trade journalist. Since 1979, he has been applying philosophical thinking to the mundane chore of buying groceries. Now vice president and editor in chief of the industry bible, *Progressive Grocer*, Mathews sees food as central to all cultures and is dismayed by the prevalence of sterile megasupermarkets that offer overabundance but suck the life out of the shopping experience. He believes technology is reversing that course and that within 10 to 15 years most of us will be ordering groceries online. *Wired* caught up with Mathews for breakfast in Boston, the only area hosting every major online grocery delivery experiment, making the region what he calls "ground zero for retailing's future."

Evan I. Schwartz (www.webonomics.com/) is a Boston-based contributing writer for Wired and the author of Webonomics (Broadway Books).

By Jesse Freund

CHIP

Photographs by Klaus Schoenwiese

HOP

The Net-savvy hip hoppers who formed Support Online Hip Hop hope to help challenge the powerful music industry and turn every musician into his or her own label.



What happens when the hood meets cyberspace?

www.wired.com/5.09/hiphop/

At 10 p.m. sharp on a Wednesday early this year, in the cavernous Silicon Alley headquarters of The Pseudo Online Network, a voice booms: *This is 88 Hip Hop on your Internet dial, your online, worldwide radio show.* A tall guy in a sweatshirt labeled DJ A. Vee stands behind a pair of turntables and pumps out a smooth, bass-heavy beat. A hundred people in oversize down coats begin to bop to the music. A pretty MC named Mecca leans into a microphone and introduces a group called The Derelect Camp, and eight stoned Derelects crowd into the sound room. DJ A. Vee ups the tempo, and the Derelects take turns freestyle rapping, improvising rhymes. It's a good 10 minutes before all eight exhaust their powers of off-the-cuff-verse, at which point Mecca asks them how it feels to be on the Net.

Derelect 1: *It's worldwide.*

Derelect 2: *It's the future.*

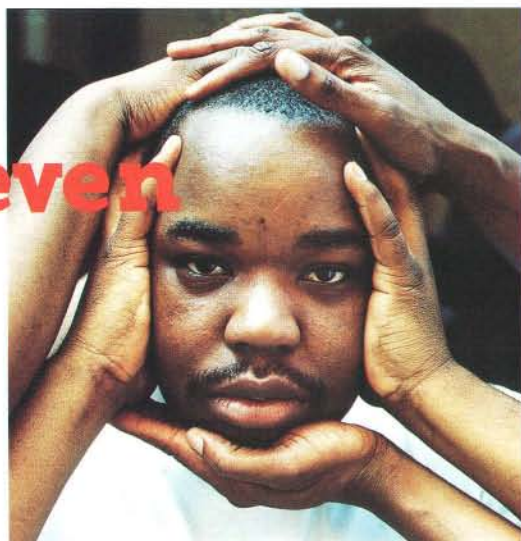
Derelect 3: *Whoever supports hip hop.*

Before and after the show, the Pseudo scene is much more businesslike. Most people com-

"S O H H dot com; the network of experts
descendants of Grandmaster Flash & DJ Kool Herc ...

ing in off the street immediately start networking – trading Java-Script tips, swapping mix tapes, recommending ISPs or record labels. Over the squeak of

sneakers on the softwood floor, a small group hangs out around a leather couch. Felicia Palmer blurts out ideas and gesticulates manically. Next to her, Randy Nkonoki-Ward half-follows the conversation, half-schmoozes acquaintances meandering by. Reclining on the couch, Steven Samuel rubs his recently shaved head and seems contemplative, his eyes revealing the thoughtfulness of an artist or philosopher. And Pascal Antoine, dressed in slacks and a pressed



Steven
The Artist

white shirt, sits with the reserved posture of an experienced busi-

nessman at a power lunch. Under other circumstances, these four probably wouldn't be friends – they probably never would have met. But today they're in the same small space at the same time. They all know the business of hip hop music, and they've studied the production of new media. They see big opportunities opening up for hip hop artists – and themselves. Hip hop began with an analog hack, when disc jockeys transformed turntables into musical instruments and created a whole new musical genre. But time caught up with them. As digital samplers and CD players replaced vinyl records and turntables, these artists were forced to confront the demise of their brand of electronic music. "Hip hop may be the first musical culture of the 20th century, or perhaps history," says noted rap scholar and Net entrepreneur Harry Allen, "to experience a material crisis due to a technology shift: from analog vinyl playback, which DJs use for cutting and scratching, to compact disc playback. It's almost certainly the first to experience such a crisis at the height of its popularity. It's definitely, absolutely the first to do so because of the replacement of analog data storage technologies with digital ones."

Digital technology's head-on collision with hip hop has produced an interesting result: digital storage is altering the sound of the music, and digital networking is transforming the process. Indeed, networking holds out the promise that one

claim membership, making www.sohh.com one of the busiest mom-and-pop hip hop hubs. Part community center and part new-media business, Support Online Hip Hop may not draw crowds like The Microsoft Network, but, then, it's produced and managed by two people – Felicia and Steven – who both have day jobs. A homemade search engine catalogs independent hip hop sites. Turntable DJs mine its data to collaborate with faraway word-smith MCs. Webmasters seek out Shockwave beats and CGI scripts. And fans hunt down those starry URLs dedicated to their favorite artists.

Of course, this independent-minded collective is not alone. At least three big forces are lining up to shape the distribution of music online. First, there are the groups of musicians, like Support Online Hip Hop, who hope to control the way their sounds are produced, marketed,

... the manifestation from Bambaataa & The Zulu Nation

has transformed to bandwidth and multimedia creations
We went from turntables to SCSI cables
operating ghetto blasters – now we webmasters ...

nessman at a power lunch.

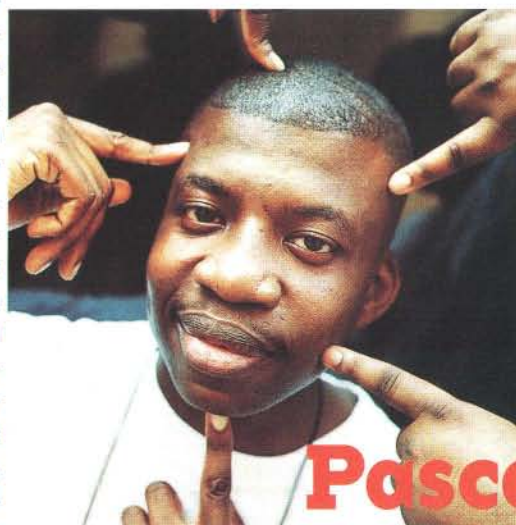
Under other circumstances, these four probably wouldn't be friends – they probably never would have met. But today they're in the same small space at the same time. They all know the business of hip hop music, and they've studied the production of new media. They see big opportunities opening up for hip hop artists – and themselves.

Hip hop began with an analog hack, when disc jockeys transformed turntables into musical instruments and created a whole new musical genre. But time caught up with them. As digital samplers and CD players replaced vinyl records and turntables, these artists were

day the Net will allow profitable self-distribution and promotion. Simply put, Net-savvy hip hoppers hope the Web will turn every musician into his or her own music label.

Last September, here at Pseudo, Steve and Felicia and Randy and Pascal came together for the first time. Soon after, the four founded Support Online Hip Hop, a loose network of Web sites revolving around hip hop culture. Today, more than 5,000 people and 2,500 sites

and sold. These include representatives from almost every



Pascal
The Digerato

musical genre and various competing players within each. Then there's the old-guard music industry, the powerful record labels and broadcast networks just starting to face the reality of Net radio and multi-

point distribution. They're also beginning to look ahead to the inevitability of downloadable albums. And finally, there's the third force, the high tech behemoths like Intel and Microsoft that really grok the technology but haven't got a clue about the sound. They have initiated their own online music ventures with an eye toward the inevitable electronic commerce bonanza on the horizon.

It's within this unstable landscape that Steve, Felicia, Randy, and Pascal have decided to stake their future. They've had their run-ins with the monied heavyweights of the music industry. But the technological upheaval and the entrance of new players gives these small-

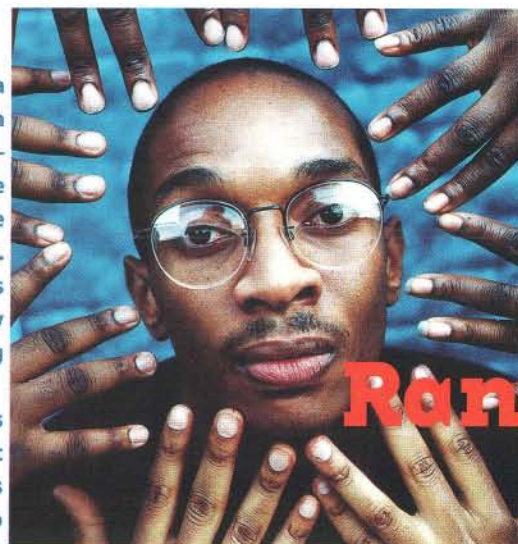
chip hop convergence are just beginning to pan out.

THE HACK

It was the summer of 1974, a day like any other in the South Bronx. An impromptu block party was under way, and those gathered longed for a little dance music and a beer or two. The sun was out. The subways screamed. Just another lazy weekend. Not so for young Grandmaster Flash.

Flash had spent the previous three years living a monastic lifestyle, and it was time for his devotion to pay off. "I put up with my mom's wincing every time I lugged home a dirty speaker from an orphaned radio or a potentiometer from the guts of a broken record player,"

But it was all worth it. He'd built the record player's killer app, and on this summer day he had his moment in the sun. As



Randy

The Showman

he approached the neighborhood park, he repeated a simple mantra: *Take the break and repeat it, take the break and repeat it.*

... maintaining Web sites, receiving platinum hits
freakin' Shockwave-looped beats to CGI scripts
from analog hacks to RealAudio stream jacks
filling up chat rooms and message boards to display raps ...

scale entrepreneurs hope – and considerable fear. Networking technologies will certainly chal-

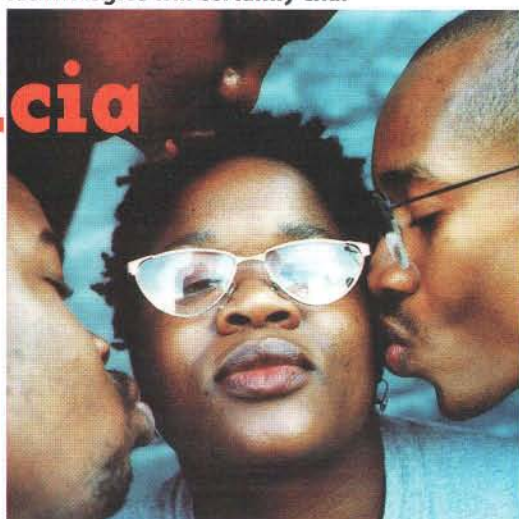
he recalls. Educated in electrical engineering at Samuel P. Gompers Vocational High School, he spent a couple years looking for a needle that would stay in the vinyl groove. At the same time, he went through various turntables looking for one that would not drag as he mixed the music. And he burned another year op-

In every piece of music, there are moments of transition when the beat changes. The break might be the movement from verse to chorus in a pop song or from strings to woodwinds in a classical work. The change in rhythm within that momentary transition is called the breakbeat. The technology that allowed musicians to repeat it over and over on time and in precision is one of the innovations to which hip hop's forefathers can stake claim.

Slowly, Flash pulled out two copies of the same album. He slipped one onto each turntable.

He then played a breakbeat on the first, and just as this was ending, he switched to the start of the same passage on the second. Then the first. Then the second. Then the first. Then the second. It was the quick-mix theory of

Felicia
The Marketer



lenge the distribution models that have defined the music industry, and they could very well enhance the power of the artist. But the details of this

timizing the mixer for a smooth transition between two records played simultaneously – by adding an external queuing system, he was able to hear the songs in his headphones before he mixed them.

Jesse Freund (jesse@wired.com) is Wired's intelligent agent.

DJing played for the first time, the first infinite loop of a single breakbeat repeated with scientific precision. Flash waited for the accolades. The crowd should have been in a frenzy, but, damn, they weren't. "There were 800 people there, but it was dead quiet. It was heartbreaking," he recalls. "Some people were like: 'What is that bullshit?' and others were just hanging with their mouths open."

The music was a little too revolutionary. So Flash recruited MC Cowboy to serve as a vocal ambassador for the new technology. Cowboy rapped over the beat, layering lyrical verse onto the music Flash made by playing two records at a time. It was Cowboy who also coined some of dance music's popular call-and-response phrases: *Throw your hands in the air and wave them like you just don't care* and *Everybody say 'ho'* and the like.

In the early '70s, DJs like Grandmaster Flash, Kool Herc, and Afrikkaa Bambaataa earned their chops playing beats in parks and on street corners. They pitted their technical skills to lay claim to musical hegemony in the neighborhood. According to lore, some DJs even siphoned juice from municipal lampposts to drive their massive sound systems – until the cops showed up. Hits like The Sugarhill Gang's "Rapper's Delight" took hip hop from the streets of the South Bronx to Main Street. In the '80s, the looped break-

itself is merely a taped version of the analog loop that Flash and others pioneered.

Since then, the music industry has seized upon hip hop in various forms, from Vanilla Ice to Public Enemy, the Beastie Boys to the Fugees. Today all electronic DJ music – including techno, house, and ambient – owes its reliance on turntables and samplers to Flash's invention. More than 20 years later, you can't walk into an elevator in a mall in Des Moines, Iowa, without hearing a muzaked version of the looped breakbeat he made possible. It's the ubiquitous background sound of the '90s – courtesy of Flash and hip hop's forefathers.

THE ARTIST

Steven Samuel roams the same streets in the Bronx that Grandmaster Flash once scavenged. It's a neighborhood filled with five-story walk-ups, where kids toss baseballs in vacant lots in the shadow of Yankee Stadium. Not normally thought of as a hotbed of creativity, this was the birthplace of America's last enduring pop-music form. "Hip hop started with experimentation and innovation," says Steve. "With digital networks we are witnessing its rebirth."

In the early '90s, Steve and six friends from the neighborhood formed a hip hop group called the Troubleneck Brothers. In

16- to 24-year-old businessmen thought it was only a matter of time before they would catapult into the hip hop stratosphere. Then things began to fall apart. The music label began to meddle in the day-to-day operations of the group, telling the Brothers how to dress, what to say, even what type of songs to write. "Snoop Doggy Dogg and Dr. Dre were big at the time, and our label wanted us to record this song called 'Drive-by New York,'" recalls Steve. "There was only one problem. There are no drive-bys in New York."

It didn't take long for Steve to figure out what many before him already knew: the music industry cares nothing about art and everything about money. A bunch of suits thought they could tell him to make music that wasn't from his heart. He now says, with a sly smile, that he left the group because of "creative differences." But those creative differences mask a greater transformation, one Steve couldn't have articulated back then.

Early in 1995, Steve drifted. He worked as a messenger, carrying packages in the subterranean world of New York's subways. Sometimes he'd catch only a couple of hours of sunlight, and the money sucked. But at night he returned home, where he shared quite a few odd attachments with his father. As a city postal worker, Steve's father

THE MUSIC HACKERS

Hip hop music began with an analog hack. More than 20 years ago, Grandmaster Flash (right) took the turntable – a relic of information technologies past – and transformed it into a musical instrument. Today you can't get away from the looped breakbeat that Flash made possible. All electronic DJ music – including techno, house, and ambient – owes its reliance on turntables and samplers to Flash's invention. Now young hip hoppers are hacking digital technology. Artists are using networks to change the music – and maybe the music industry – once again.

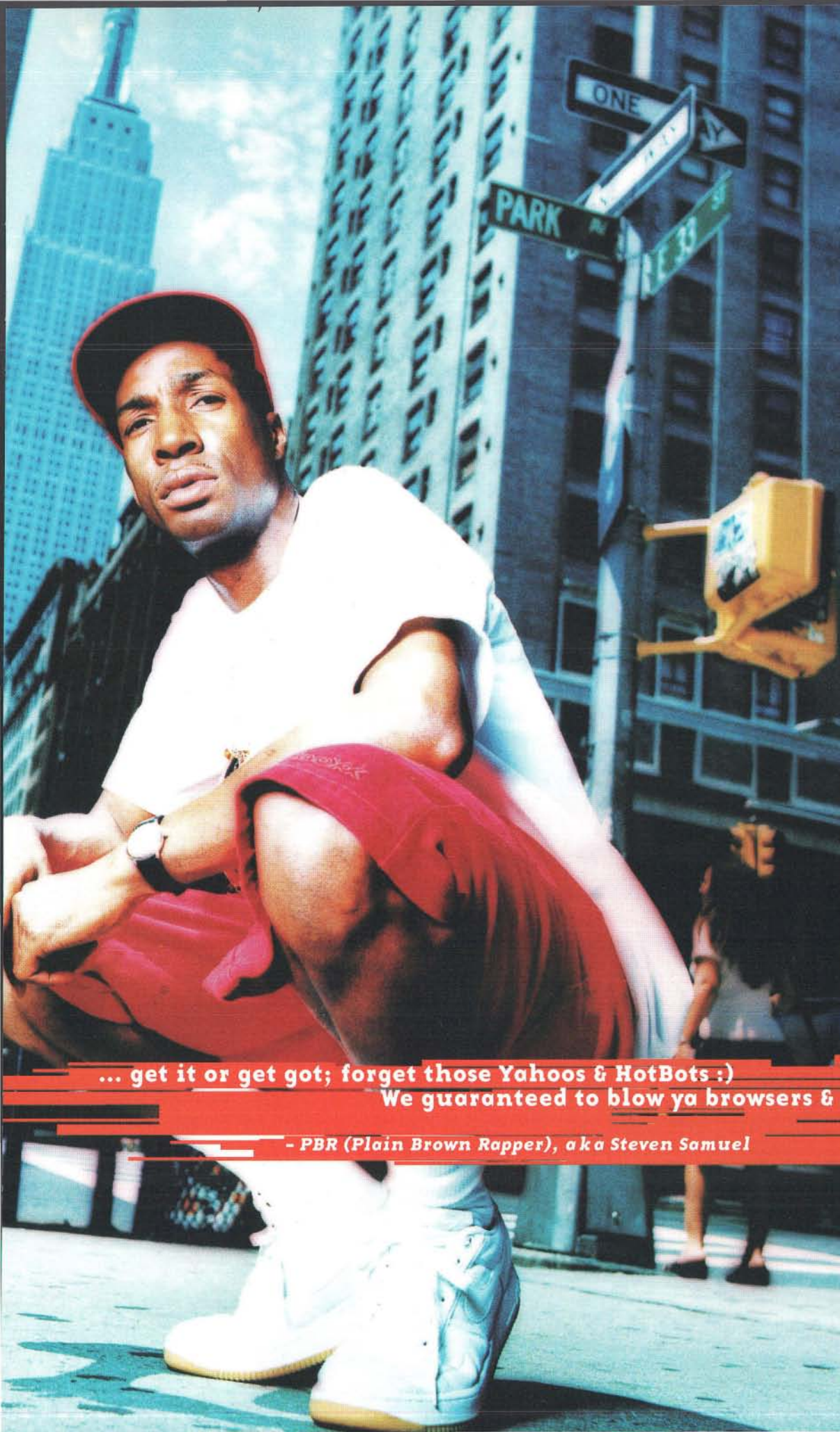


... using the Digital Revolution, changing the distribution the way we sell our contributions – it's hip hop's cyber-revolution opening opportunities to the hip hop community is "Ya One-Stop Spot For Online Hip Hop"...

beat was further popularized with the widespread deployment of digital samplers, which play loops of prerecorded sounds. But digital sampling

1992 they released their first album, *Fuck All Y'all*, and by 1995 the Brothers had landed three videos on Black Entertainment Television and three singles on the radio. Having recently inked a distribution deal with Stepsun Entertainment, these

also dealt with packages. But the old man's passion was the family computer. In 1976, Steve's



father had purchased his first machine, a TRS-80 Model 1 (the computer came with a cassette deck – the disk drive hadn't been invented). He spent 20 years and many desktop models teaching himself to program in C. The proto-hacker then kept coding lottery-crunching algorithms in a one-man war to nail New York State's jackpot. He scored a few small hits along the way, which nourished his lotto fever.

In the solitude of life after the Troubleneck Brothers, Steve, long familiar with computers, began to explore the burgeoning online world. One day, while flirting with anonymous women in AOL chat rooms, he accidentally stumbled upon a hip hop forum. Rhyme-savers from across the country were improvising verses and battling the poetry of other rappers. Baited by an MC, Steve responded with a few lyrics of his own. By the end of 1995, after a few two- to three-hour sessions, Steve became an honorary member of the Cybermics, what he calls the first online posse of hip hop MCs. The Net offered a new interactive medium that dovetailed nicely with the call-and-response style of hip hop. Without music to shield their online rapping, only the most talented

... get it or get got; forget those Yahoos & HotBots :)

We guaranteed to blow ya browsers & ISP spots."

- PBR (Plain Brown Rapper), a.k.a Steven Samuel

freestylers could keep up.

"Online hip hop was something completely different," says Steve. "They rapped, sure, but more than that they had invented a new language to capture the immediacy of the Net. 197 ►



From Hollywood to Main Street, it's being heralded as the beginning of a home entertainment revolution. It's called DVD Video. With a digital picture that's better than laser disc, and state-of-the-art digital audio, DVD is destined to change your home into a, well, you get the picture. Now movies meet the digital age. And Philips Magnavox is there to help make the introductions.



DVD Video from Philips Magnavox.
Technology for the heart, the spirit and the imagination.

Let's make things better.

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Nintendo's Crafty Fox

Head Space

MetaCreations has based a CD-ROM on physics guru Stephen Hawking's sublime lecture about the origins and the future of the universe. The theorizing is perfectly wonderful, but presented via low tech audio and scrolling text, *Life in the Universe* can be fairly boring. Without video and with the eyestrain that comes from reading off a monitor, the heady tone is quicksand-thick.

Fortunately, the text is tastefully hyperlinked to brilliant multimedia. As the scientist narrates, out pops Phage, your virtual lackey, who travels the universe to latch onto



Out of this world.

black holes and big bangs. Once it grabs hold, out come data nuggets and animated video. So beautiful is the design here that you'll find yourself eschewing the time lines to float through the maze of golden portals of this virtual outer space.

Life in the Universe makes the cut as prime entertainment. It whisks you away, sparking the terrain in your brain that burbles with a reality so virtual you'll swear it is real. — Harold Goldberg

Life in the Universe: US\$39.95. MetaCreations: on the Web at www.bbcom.com/products/metatool/mtframe.html.

When news of a Nintendo 64 edition of *Star Fox* was announced last year, I fondly recalled the groundbreaking original game for the SNES console. In 1991, it simply blew away any other title and still ranks as one of the best games of all time. It's enough to bring tears to my eyes. As soon as the Japanese version of *Star Fox 64* arrived, I was sprinting for the home-theater room. After years of false promises about the SNES sequel, the pressure was really on Nintendo. But all my fears of a weak-ass game with fancy graphics proved unfounded: *Star Fox 64* is the business. With exceptional and innovative titles such as *Turok: Dinosaur Hunter*, *Blast Corps*, and now *Star Fox 64*, Nintendo is more than making up for a lack of quantity.

The original cast of lovable space varmints, the Star Fox Team, takes up the mission to save the planet Corneria from the evil space critters, the Star Wolf Team, and their boss Andross. The story line may not be anything to discuss in philosophy class, but the game mechanics and design are close to perfect. Like the original, some of *Star Fox 64*'s 15 worlds, or levels, are on rails with limited movement. Others are in 3-D arenas where flight is restricted only by the perimeter boundaries.



Get ready to rumble.

Barrel rolls and Immelmann maneuvers in *Star Fox*'s Arwing craft are crucial for survival. And the action is positively cinematic. The enemies, environments, and bosses are meticulously rendered, and even when the action borders on the insane (which is often), frame-rate slowdown is minimal. Only the lack of a Save feature keeps *Star Fox 64* from being perfect.

Nintendo has introduced the infamous Rumble Pak, a curious plug-in that vibrates when something onscreen explodes. Industry folks have a joke about game testers' penchant for playing *Star Fox 64* with the Rumble Pak planted firmly in their groin area (instead of in their hands where it belongs). The truth is that the Pak adds a new, albeit minor, dimension to immersive gameplay. *Star Fox 64* features a staggering 700 audio blurbs from 25 central characters. This apparently helps a player's success rate quite a bit, but since I don't understand Japanese (damn those early foreign release dates!), I have to wing it. I like to believe this cruel language barrier is the reason I so often crash to the ground in a fiery ball. — Scott Taves

Star Fox 64: US\$69.95. Nintendo: +1 (206) 882-2040, on the Web at www.nintendo.com/.





The Sponsored Life

A Zine with Cojones

If you think Latino humor means middle-aged TV comedians who dress like kids and yell at each other through blacked-out teeth, it's time to pick up *Pocho Magazine*. Editors Esteban Zul and Lalo Lopez pack each issue like a burrito full of political satire, original comics, and inventive Spanglish turns of phrase.

On the first page of *Pocho* issue *numero ocho*, Bob Dole appears as a spokesmodel promoting the Nacho Industry Council's new slogan, "It's Nacho Country!" Other highlights include the first Mexiclone; baton-wielding LA cops who badly misinterpret the three-strikes law; a regu-



Borderline humor.

lar column from Rabad Rudy, the Hispanic Ed Anger; and a translation of "Macarena," henceforth to be known as the "Latin Hokey Pokey."

The online version, the Virtual Varrio, includes the Roach Hotel, full of Lalo Alcaraz's L.A. *Cucaracha* cartoons, and the "alien" blockbuster *Dia de la Independencia*.

Pocho is home to the most extreme deadpan hoaxes since Paul Krassner's *Realist*. Don't worry if you can't read much Spanish – neither can the editors. – Dan Howland

Pocho Magazine: US\$3 (plus \$1 shipping). *Pocho*: +1 (213) 368 6119, on the Web at www.pochomag.com/.

Most people look at commercials as a chance to get up, stretch, and grab another Klondike bar from the freezer before *Melrose Place* resumes. But, as the riveting documentary *The Ad and the Ego* makes clear, restless viewers are missing out on a seamier show. From the billboards that line highways to the plugs that saturate magazines and television, advertising is one of the most powerful forces shaping our culture.

Set to a brilliant original score by noise artists Negativland, *The Ad and the Ego* traces the evolution of advertising and its impact on our world. Though the hour-long video has come under attack for its MTV quick-cut visuals, this pace is what makes it successful. Juxtaposed with thought-provoking narration, the seemingly benign ads take on a nefarious air.

"Advertising is designed to create endless self-criticism, all sorts of anxieties, all sorts of doubts, then to offer the entire world of consumer goods as salvation," intones Chapman University professor Bernard McGrane as the film cuts to a familiar moisturizer commercial warning 24-year-old women of the horrors of dry, aging skin. Our unwavering faith in science, *The Ad and the Ego* argues, supports the belief that



Exploring society's primitive drives.

the right product will make our mouths "baking-soda clean," attract mates, maintain stable families, and avoid social embarrassment. The only glitch is that despite advances in technology, science has yet to develop an elixir that fulfills our most basic emotional desires.

Refreshingly, *The Ad and the Ego*'s critique does not condemn advertising, but rather acknowledges its influence. Filmmakers Harold Bohem and Chris Emmanouilides hope to raise awareness of the danger posed by a few wealthy companies controlling the means of communication and to dispel the belief that government is the only impediment to our freedom.

Despite our insistence that we are impervious to corporate-sponsored manipulation, we can all recall a time when we yearned for a nicer car, faster computer, or smoother skin. "I don't pay any attention to ads, I don't look at them, I just tune them out, they don't have any effect on me" – I hear this most often from young men wearing Budweiser caps," notes media critic Jean Kilbourne. *The Ad and the Ego* may not soothe your worries, but it will change the way you look at them.

– Anne Speedie

The Ad and the Ego: US\$49.95. California Newsreel: +1 (415) 621 6196.

Roam Free

Nextel's PowerFone iP370 has two things going for it that leave other cellular phones in the dust. The first is nationwide service without roaming fees – something that saves me roughly US\$10 per day while I'm traveling. The second is a big button on the side of the phone that turns the unit into a 21st-century walkie-talkie. Just press the button, wait for the beep, and talk: your voice automatically gets transmitted to everybody in your predefined workgroup. Although it's designed for contractors trying to manage large job sites, I use it to talk with my wife from anywhere around town.

If you're a bean counter, you'll also be thrilled that Nextel bills by the second, rather than rounding up to the minute. That could save you 25 to 50 cents per call! And like other digital cellular systems, Nextel has built-in paging and voicemail.

Nextel's system does have some drawbacks, however. Though the phone, based on Motorola technol-



A power phone to please the bean counters.

ogy, gave me nearly three hours of talk time and ten hours of standby with its standard battery, it's also three times the size and twice the weight of my analog cell phone. And while the sound quality is great if you are calling another Nextel phone, it sounds like you're talking underwater if you call a landline. There is also a weird one-third second delay – a result of the time digital phones need to compress and decompress your voice. It's as if you've reached somebody on the space shuttle.

I tried Nextel in Seattle, San Francisco, San Diego, and Boston and found the coverage to be excellent – although the Seattle system tended to get overloaded from 2 to 6 p.m. Nextel's service is available in more than 200 cities today; the company says that it will cover 75 percent of the United States by the end of 1997. For people who travel a lot, this phone can save you a bundle. – Simson Garfinkel

PowerFone iP370: US\$199; \$35 to \$140 base rate per month. Nextel: (800) 639 8359, on the Web at www.nextel.com/.

An Eye to the East

Nintendo versus Sega on one page; the eightfold path to yoga enlightenment on the next. *Eastern Standard Time*, a hip reference work for decoding Asian cultural exports, revels in postmodern contradiction, gleefully juxtaposing high and low culture, ancient and brand spanking new.

Japanese anime, HK movies, Taoist philosophy – there's a lot of ground to cover when the territory is Asia. Pictorial guides on folding origami swans share space with synopses of the 26 Godzilla films. Sound ridiculous? Sure. Making sense of an ancient, diverse continent in only 337 (albeit dense) pages is a task that begs for abysmal failure. Even aspiring to reduce all of Asia into a smorgasbord of info-nuggets smacks of the worst tendencies of '90s attention-deficit-disorder consumer culture. Unless it's done right, that is, with care and commitment. Grounded in a contextual sensibility that is both ironic and bitingly aware of Western racism and imperialist greed, *Eastern Standard Time* will upgrade any coffee table. Who knew that the yo-yo was originally a Filipino weapon? Or that Yoko Ono's father



Tracing the rise of Asian influence on Western culture.

was head of the Bank of Japan?

The book's major drawback is its somewhat arbitrary organizational structure – amorously titled sections like “Trends and Phenomena” do not lend themselves to easy access. There's also a more subtle weakness. *Eastern Standard Time* bills itself as “a guide to Asian influence on American culture from Astro Boy to Zen Buddhism.” But cultural flows are, at the very least, bidirectional. It's all well and good to note that Disney ripped off seminal Japanese animator Osamu Tezuka in the movie *The Lion King*, but it's also worth pointing out that Tezuka himself credited Disney cartoons as a major inspiration for his life's work. West influences East influencing West. And vice versa.

Still, that's just a quibble. *Eastern Standard Time*, like Asian cuisine, is tasty fare indeed.

– Andrew Leonard

Eastern Standard Time: A Guide to Asian Influence on American Culture from Astro Boy to Zen Buddhism, by Jeff Yang, Dina Gan, Terry Hong, and the staff of A. Magazine: US\$15. Mariner Books, Houghton Mifflin Company: +1 (617) 351 5000, on the Web at www.hmco.com/.

Wo/Man-Machine Interface

Boys and ray guns. Girls and microwaves. Despite many changes in '90s cultural life, “serious” technology is still somehow a boy thing, while the tedious stuff is left for girls. In Japan, for example, this process has played itself out with digital technology. To the average middle-aged salaryman, computers look rather like typewriters and hence are demeaning things best left to the secretaries. Result? A generation of smart, techie, twentysomething women whose skill sets are ignored by their Luddite bosses.

These kinds of boy/girl divisions are the subject of Jennifer Terry and Melodie Calvert's *Processed Lives: Gender and Technology in Everyday Life*, a collection of theoretical essays about what happens when our mixed-up attitudes toward machines collide with our even more confused attitudes about sex roles. For the book's contributors, this confusion pervades every aspect of our culture. In your local Toys “R” Us, for example, the Barbie Liberation Organization is secretly swapping the



“Let's go shopping.”

voiceboxes of Barbies and G.I. Joes. “Dead men tell no lies,” growls post-op Barbie, while Joe, in a high-pitched voice, suggests, “Let's go shopping.” More and more, new technologies are making hints, jokes, and suggestions about gender.

If the connection between integrated circuits and sex roles seems less than obvious, then some of the analysis in this book may leave you cold. Most of the writers are veterans of the cultural studies scene, and on the whole they are far more at home with the subtleties of French theory than the technologies they analyze; some authors frankly admit they are technological outsiders. Still, despite evoking geeky twinges of annoyance when a so-called expert seems not to understand, say, nonlinear dynamics, this book is an interesting read. Those tempted to think of their machines as neutral bystanders in the gender wars will find plenty to change their minds. – Hari Kunzru

Processed Lives: Gender and Technology in Everyday Life, edited by Jennifer Terry and Melodie Calvert: US\$18.95. Routledge: (800) 354 9706, on the Web at www.routledge.com/.

Hot Connection

The explosion of the Net has made killer apps from infant start-ups the norm rather than the exception. Case in point: Adam Hinkley's Hotline, a freeware communications suite that has spawned a fanatical following.

Hinkley's vision of inter- and intranet communication is an electronic conferencing program for the Mac – FTP with an attitude. (A beta PC version is due out shortly.) Users sign on as either a Hotline client or server. The server provides news, chat, and file areas where clients can interact; users download this shareware, then connect to any server listed in its directory. Sites sprout up so sporadically that Hotline also



Way new chat space.

tracks currently accessible servers, providing a description and number of users logged in. The structure is reminiscent of the BBS days, although Hotline IP addresses, not phone numbers, denote the location of servers.

Perhaps most useful is Hotline's ability to resume interrupted downloads. Suddenly, 20-Mbyte files aren't so daunting, and we won't be reduced to tears when a connection is severed with 10K remaining.

Hotline is an indispensable tool in any internaut's arsenal.

– Andrew Cockwell

Hotline 1.1b21r2 for Mac: shareware. Adam Hinkley: email adam@hotlinesw.com, on the Web at www.hotlinesw.com/.

#1 I want to build Web Applications. #2 I want to do it in Java™. #3 I want access to my database. #4 I don't want to program. #5 I want to program if I want to. #6 I want to use spreadsheets. #7 I don't want plug-in's and I don't want Active X™. #8 I want it to run cross-platform. #9 I want it to run on the NC (whenever it arrives). #10 I want it to run on the one Unix™ machine in the corner. #11 I don't want Bill to own it. #12 I don't want to buy another book on Java. #13 I don't want to sacrifice speed. #14 I don't want to sacrifice time. #15 I don't want to sacrifice money. #16 I don't want to sacrifice. #17 I want to do my presentations on the Web. #18 I'm usually reasonable, but not always. #19 I only buy the best tools. #20 I don't want to have to learn a scripting language. #21 I want it done quickly. #22 I want to be able to push it. #23 I want to build Marimba Castanet™ Channels. #24 I want a timeline. #25 I want it to talk to my server. #26 I want to customize it. #27 I want the best user-interface tools. #28 I want interactivity and animation. #29 I want business presentation tools. #30 I want control. #31 I want it to be easy. #32 I want to build applets visually. #33 I want push-button publishing. #34 I don't want to hard code. #35 I want asset management. #36 I want to add just about anything. #37 I don't want to get a PhD. #38 I don't want to hire a guru. #39 I want to do it myself. #40 I want to use other people's components. #41 I want more than the status quo.

#42 I don't want to
want to have to go to Redmond.
pressions. #45 I want math.
#47 I can't wait, I want it now.
today. #49 I want to put my
I want buttons, sliders and
it to be intuitive. #52 I want
be able to afford it. #54 I

THE CODA™ MANIFESTO

compromise. #43 I don't
#44 I want variables and ex-
#46 I think Java is here to stay.
#48 I know where I want to go
business on the Web. #50
floating windows. #51 I want
visual feedback. #53 I want to
don't want to use a resource

editor. #55 I don't think Java is just another programming language. #56 I want plug-and-play. #57 I want nested objects. #58 I want to work with multiple documents. #59 I want object-oriented design. #60 I want templates and styles. #61 I don't think HTML is the solution to everything. #62 I want reusable objects. #63 I want to use it on the internet and on my intranet. #64 I want drag-and-drop. #65 I am tired of doing things the old way. #66 I want to create dynamic content. #67 I want multiple windows. #68 I want a flexible solution. #69 I want JDBC support. #70 I want options, not road-blocks. #71 I want floating palettes. #72 I want to be able to customize it. #73 I am tired of using HTML. #74 I want to build content in Java. #75 I want to get to the next level. #76 I want an open architecture. #77 I want creative control. #78 I don't want to pay too much. #79 I want data-aware objects. #80 I don't want work arounds. #81 I want to harness the power of Java. #82 I want to build a front-end to my server. #83 I don't want bouncing heads. #84 I want to build Java Apps. #85 I want RandomNoise Coda.



Any Questions?
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<http://www.randomnoise.com/wired.html>

2 + 2 is Loud Microsoft's new Franken-toy, an ActiMates version of the popular cartoon character Barney, comes installed with 2MB of memory – not to mention a 2,000-word vocabulary, plus sensors in the doll's feet, hands, and eyes. Wirelessly connect the beast

to your PC and increase its knowledge to 14,000 choice words. If you could only teach Barney to curse, your kids wouldn't be the only ones having fun. Release: September. Microsoft: +1 (800) 426 9400.



Body Language Visionics' latest software, Facelt, uses a monitor-mounted camera to identify an owner and allow access to a computer. Version 3.0 features the Facelt Cipher, an encryption program that turns camera portraits into crypto keys. Release: September. Visionics: +1 (212) 327 7421.

Macro Machines Activision is taking dead aim at *MechWarrior 3* and *Earthsiege 3* with its new game, *Heavy Gear*. The title sports smaller, faster robots capable of carnage in intensely tight environments. The anime-style story should help *Heavy Gear* emerge victorious in the Robot Game War of 1997. Release: Fall. Activision: +1 (310) 255 2000.



Ain't Rocket Science NASA scientist Doctor Robert Mah has crafted a tiny robotic brain probe. The micromachine employs neural net software to locate abnormal colors and feel different textures in brain tissue. If development tests later this year prove successful, a surgeon using the device would be able to detect cancer in a patient within one second. Release: Late 1997. NASA: +1 (415) 604 5026.

Ready, SET, Then Go Have you heard of the Secure Electronic Transaction protocol? This standard portends the beginning of full-scale e-commerce. IBM will complete SET's first North American test, and the result will be an online version of America's largest retailer, Wal-Mart, available to the public this fall. Release: September. IBM: +1 (703) 205 6338.



Whack the Wonks In the book *The Gordian Knot: Political Gridlock on the Information Highway*, professors W. Russell Neuman, Lee McKnight, and Richard J. Solomon detail the insane history of US communications policy, which is still based on 19th-century railroad regulation. Except for broad goal setting and antitrust enforcement, the authors would just as soon take government out of the regulation biz. Release: September. MIT Press: +1 (617) 253 5249.



Must-See Digital TV

Stare into your idiot box and imagine the changes digital TV will herald. What do you see? More channels? HDTV-picture quality? These advances make good use of digital pipes, but there are other compelling apps besides more and prettier programming. ACTV, a New York-based one-to-one television programming company, plans to exploit digital feeds by approaching the long-forgotten promise of interactive TV, but in a smart and practical way.

The company's InSports technology allows cable viewers to seize control of sporting events. Couch potatoes need only upgrade to a digital set-top box and a remote control with four new, brightly colored buttons. Then, by subscribing to a US\$9.95 premium channel offered by Fox regional affiliates Sports West and Southwest, aficionados can switch camera angles, cue up instant replays, and call for stats during live baseball, basketball, and hockey games.

ACTV's software works within the set-top box itself. The company sends four digital video streams



to the TV through one regular cable channel. Viewers pick the feed they want – a desired camera angle or a particular instant replay – with the remote control. There's no need for upstream bandwidth with InSports' programming – save from the remote control to the cable box – thus the problems that plagued earlier attempts at interactive TV have been eliminated.

"The problem with interactive TV services was that they were predicated on technology that didn't exist," says company CEO William Samuels. "We're a content – not technology – company. All we need to do is deliver four separate video feeds, and we can do this for every cable operator at no cost to them."

By 1998, between 12 and 15 million households will receive digital cable signals. If you've ever listened to an armchair quarterback yell at a referee, then you've heard the demand for individualized sports. Just think how much money ACTV could make if it could teach InSports to grab a beer out of the fridge. – Jesse Freund

Release: Late 1997. ACTV: +1 (212) 262 2570.



JUST OUTTA BETA

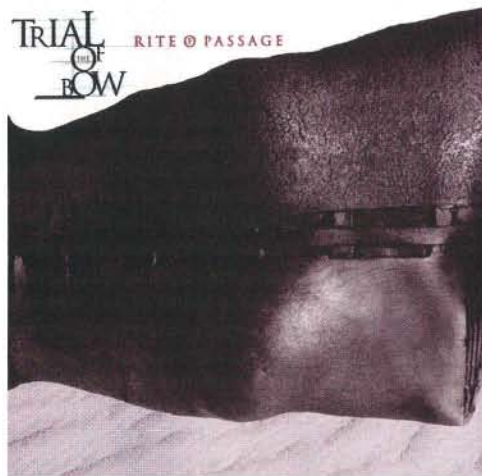


Trial of the Bow

Rite of Passage
Release Entertainment

Trial of the Bow is Renato Gallina and Matthew Skarajew, two Australians who embrace myriad traditional/exotic instruments to concoct a singular sound rooted in 13th-century music. Based on a haunting, cabalistic drone once chronicled by distant forebears from the East, *Rite of Passage* is a primal journey that stems from the sacred relationship between man and earth. While ethno-ambient forays are becoming more commonplace in this age of transglobal recording techniques, Gallina and Skarajew set a new standard as they fearlessly backslide on the space-time continuum.

Centuries of sound melt away as wordless chants, tabla, tamboura, Tibetan singing bowl, oud, and hammered dulcimers coalesce into an intoxicating drift of tantric exultation. With the profound expressiveness of things struck, plucked, and bowed, this sojourn courts back-to-basics philosophy, mental-



ity, and execution. Stirring compositions like "The Court of the Servant" are impeccably recorded and painstakingly layered with flute and guitar, as well as ancient hand percussion, frame drum, and *manjira*. With clay artwork on the cover and such titles as "Serpent," "Muezzin," and "Ubar," the album directs the listener toward a mystical terrain that animates the imagination and fulfills our implicit need for archetypal tokenism.

A wholly spiritual ceremony, *Rite of Passage* deemphasizes corporeal response and emphasizes commingling with the greater, more pervasive forces of nature. Comfortably immersed inside the sonic reverberations of an eternally ecstatic rhythm method, these Melbourne musicians evoke a delirium that can be found precisely where the pyramid meets the eye and windswept desert meets sheltering sky. Holy meditations aside, their celestial sound is still something extraordinary to behold.

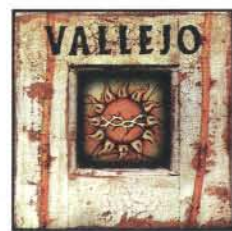
— Mitch Myers

Various Artists

The Knights Who Say Dot
Dot

Swedish label Dot rounds out the Scandinavian music boom detonated by Kmeda's effervescent *pop på svenska*. Building on accelerated platforms of drum and bass, artists Quant and Roupe create electronic dance music, gravitational curvatures of sound that reveal unexpected tones and strobe-effect melodies. These experiments are balanced by the baleful beats of Tupilaq and Friend, who are beset more by personal demons than pure wonderment. Even with these aesthetic polarities, *The Knights Who Say Dot* manages to produce a coherent and valiant new source of electronic enlightenment.

— Dan Sicks



Vallejo

Vallejo
TVT

This Austin quintet's self-titled debut bristles with hooks. Vallejo merges the catchier aspects of metal, funk, and Latin into a mix that sounds as organic on disc as it seems unnatural in principle. Blistering, air-guitar-worthy licks cohabit with blues-tinted riffs and the synopated bustle of Caribbean rhythms. Lead singer A. J. Vallejo's drawling delivery simultaneously channels Aerosmith, the Allman Brothers, and Santana. Vallejo's lyrics teem with a slacker's good-natured anomie, but the band's agile musicianship clearly results from a rigorous work ethic. Thank God these guys ignore their own gospel.

— Eamon Dolan

Snooze

The Man in the Shadow
SSR/Crammed Discs

The French don't quite have the rock thing down, but they are producing some world-class electronica. Here, Parisian musician Snooze crafts a respectful, headphonic fusion of film soundtracks, heady beats, memorable melodies, and dub styles. He emphasizes cinematic sonics that evoke a wicked blend of Ryuichi Sakamoto, Ennio Morricone, and Lee Perry. But when the beats break in, as on the vox-'n'-drum-'n'-bass track "Your Consciousness Goes Bip," the results are exquisite, and "Tribute to Horace" tucks a vocal loop from Massive Attack's "Hymn of the Big Wheel" into a comfy new home.

— Scott Taves



Material

Seven Souls
Trioloka

Based on William Burroughs's novel *The Western Lands*, this work fuses spoken word and the music of Bill Laswell's Material to create a melting soundscape of ambient, trip hop, world, dub, and environmental. The disc—a revision of the original 1989 release with new music added—features the likes of Indian violin master L. Shankar, Sly Dunbar, Jah Wobble, and DJ Spooky. The tracks can swirl into interstellar electronic explosions or dissolve into lush organic landscapes, slowly unfolding over Burroughs's bone-dry voice. The effect is hypnotic; the images apocalyptic and hallucinatory.

— Roger Park

Various Artists

White Elephants & Golden Ducks
Shanachie

Music of Myanmar is seldom heard outside the country's borders, a situation producer Rick Heizman intends to rectify with five CDs of folkloric music he recorded in Yangon in 1996. *White Elephants*, the first in the series, gives listeners an intriguing overview of a unique tradition. You'll find soothing songs for voice and Burmese harp, masterful percussion on the *chau lon bat* (a set of tuned drums that speaks in the tongues of India, Africa, and Java), slide guitar adapted to local styles, and much more. The selections, though tranquil in tempo and temperament, practically overwhelm with their quiet virtuosity.

— j. poet



Steve Turre

Steve Turre
Verve

Trombonist Steve Turre holds a secure place in the world of cutting-edge jazz. His robust techniques are inspirational to youngbloods tackling the hoary horn. While on tour in Mexico, Turre discovered that his Aztec ancestors specialized in the trombone's predecessor—the seashell. Since then, Turre himself has mastered the shells as wind instruments, blowing them to supply the elegant, warm color tones heard throughout this set of Latin-influenced classics and originals. Employing an ensemble of heavyweight players, Turre successfully blends his birthright's distant past with the wave of the future.

— James Rozzi

Anna Homler, Geert Waegeman, Pavel Fajt
Corne de Vache
Victo

Performance artist and composer Homler joins forces with Waegeman (keyboards, mandolin, and violin) and Fajt (percussion) for more structured, song-oriented music than you might expect. With invented language, obtuse narratives, and humorous stories—"Blue Flame Blue" is about spontaneous human combustion—the musical accompaniment bounces among quasiminimalist compositional techniques. Add wild improvisation on toy instruments, found objects, and whimsy, and you have some fascinating listening.

— Dean Suzuki



Lead Belly

Bourgeois Blues
Smithsonian Folkways

Lead Belly's genius was manifold. A walking encyclopedia of traditional US folk songs, he was never timid about transforming that music with new lyrics and instrumental styles. Possessing a mighty voice and a robustly rhythmic 12-string guitar sound, he continues to influence rock performers today. This pluperfect collection of Lead Belly's 1940s recordings offers a superior overview of the man's artistry: new mastering of acetate discs results in surprisingly realistic fidelity, and unreleased material like "Abraham Lincoln" (in which Abe undergoes a Jesus-like resurrection) makes this essential listening.

— Norman Weinstein

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Relive Your Youth

While kids can be hyperactive, screaming, and generally unpleasant beasts, it is sometimes possible to uncover the innocent creatures lurking beneath the surface. If you're like me, however, and you never actually meet any youngsters (let alone have your own brood), you're unlikely to see their more angelic alter egos. Enter *The Twelve Loveliest Things I Know*, an interactive movie by painter Chris Hales that provides illuminating insight into a child's world.

Hales's work is the main feature on *Laboratory 002*, second in a series on Neville Brody's Research Publishing



Through a child's eyes.

label. This CD-ROM explores the thoughts and joys of children describing their loveliest things: "the feel of petals," "a cloud that looked like a crocodile," "when you're hot and you have a nice cool drink." This all glides by in a dreamy, relaxed way and takes some getting used to. Doing away with conventional narrative usually means saying goodbye to any hope of long-term viewing engagement, but this CD-ROM stays absorbing well into your youth-filled dreams. — Phil Gyford

Laboratory 002: US\$28.
FontWorks UK Ltd.: +44 (0171) 490 5390, on the Web at www.research.co.uk/.

Paternal Pride

Open the file called "typical computer game" on the cluttered desktop of your mind and you may encounter a well-deserved – if not entirely accurate – picture: a soulless, pointlessly violent exercise that rewards only the paranoid eye and the spastic trigger finger. Got that image firmly in mind? Now forget it and consider *Princess Maker 2*, a somewhat subversive – some might think offensive – game geared to bring out all the paternal, responsible, nurturing, and otherwise shameful attributes that lie dormant in the heart of every joystick junkie.

In *Princess Maker 2*, the player assumes the role of a royal caretaker given charge of a girl's upbringing in a mythical medieval society, with the ultimate goal of grooming her into princess material. Choose your daughter's name, blood type, and date of birth, and don't forget to save some money each year for her birthday gift or you will – I guarantee it – feel rotten when funds don't permit one. All aspects of the young lady's upbringing must be overseen: education, morals, health, employment, adventures, vacations, birthdays, diet, father-daughter chats – the works.

Life's physical aspects must also be attended to. You will watch the young miss grow from a gangly preadolescent to a mature young



How will your little princess turn out?

woman. As she ages, expect teenage moodiness and rebellions, spells of sickness, adventures in hostile lands, emotional crises, and hard financial times. Somehow it's all worth it seeing her smiling on her 13th birthday, happy, healthy, and proud.

Princess Maker 2 plays tricks with your heart. After only a year, I had become fanatically protective of Rhalina, born September 13, blood type A. Determined that she would always be on an equal footing with the world, I eschewed low-end homemaker skills and concentrated on the hard science that would help her make sense of the universe, the poetry and dance that would soften her soul and strengthen her body, the religious training that would fortify her knowledge that her world is a happy place ... and the combat skills to kick the living bejeezus out of anybody who tries to tell her otherwise.

To many, *Princess Maker 2* will seem horribly sexist, sick, and wrong. The fact is, the game is only as good or bad as the player wishes it to be. Personally, I can't think of many games that – never mind the bizarre cultural undertones – so consistently reward the sensitive guardian.

— Chris Hudak

Princess Maker 2: US\$24.95. Ignite: +1 (714) 833 3838, on the Web at www.ignited.com/.

Space Jam

Astronauts have always seemed so gloriously liberated. They succeed in escaping the gravity of the earth, and, simultaneously, the gravitas of the political preoccupations in their homeland – even if politics is what propelled them into space.

Such was the achievement of Soviet cosmonauts sent on a routine mission to the space station *Mir*. While their extraterrestrial activities were methodical and predictable, back on Earth their countrymen were playing a funny trick on them. In the time it took *Mir* to whiz around the planet 47 times, there was a putsch in Moscow – Gorbachev was out, and Yeltsin was in. The cosmonauts blasted off from the Soviet Union and crash-landed in the Russian Republic.

Out of the Present is filmmaker Andrei Ujica's spare but delightful documentary about this *Mir* mission. And though he couldn't have anticipated his original



More than one mission accomplished.

subject would coincide with the collapse of the Soviet Union, Ujica has adroitly managed to encompass both dramas, using elemental effects.

But what's really marvelous about *Out of the Present* is the mission crew. They are so, well, human. True, cosmonauts Anatoly Artsebarsky and Sergei Krikalev go about their business with admirable composure: even when the oxygen system fails in Artsebarsky's suit, he mentions it as an afterthought. But we also glimpse the giddiness behind the scenes, as when Krikalev and a new companion ride atop a metal canister as if it were a horse.

Yet for all his sanguinity, it was a long 10 months in space for Krikalev. When a reporter asks the cosmonaut what he likes best about Earth from "up there," Krikalev replies, "Most of all, what we can't see from up here: people." — Heidi Kriz

Out of the Present: US\$30. Noon Pictures: (800) 343 5540, +1 (212) 254 4118.

A Useful Know-It-All

Bookmarks are far from perfect pointers to information sources. Sometimes they just lead to a disappointing message that a useful site has gone under. At that point I've lost the reference, the content, and any links that went with it. Not a very good way to manage information.

Grasp's KnowItAll has become my surrogate knowledge keeper. The program creates a graphical hierarchy of concepts and relationships that represents my interests. When I minimize the program, these categories appear as a row of icons on my desktop. As I browse the Net, I highlight something interesting,



Data management.

then select a KnowItAll icon, which gobbles up the text and stores a reference to its source. I go back later and add titles, authors, and other metadata to define my growing collection of knowledge.

Even if a site goes under, I still have the highlighted material stored locally. Since I retain a copy of the text I consider important, I hone further Web surfing using a site's content as my guide.

With today's onslaught of information, I find KnowItAll an indispensable adjunct to my already overburdened meat memory. — Daniel Rasmus

KnowItAll: US\$49. Grasp: on the Web at www.grasp.com/.

Speed reader and industry optimist **ANN WINBLAD**, of Hummer Winblad Venture Partners, advises software companies on strategic development. **I Can Resist Everything Except Temptation: And Other Quotations**, by **Oscar Wilde**. "Wilde's witticisms stop people cold. And every word counts. In today's media-steeped culture, where the sound bite is coveted by far-reaching companies, the master of the quip would have been in high demand. But while another turn-of-the-century writer, Jack London, made millions, Wilde died penniless at the age of 34. It's too bad." **Personal History**, by **Katharine Graham**. "An insightful work for today's software companies, Graham portrays the newspaper dynasties — Knight-Ridder, the *Tribune*, and the *Post* — that are still in the business after decades of change, while technology groups are rocking and rolling at the edge of a nascent industry. What can be learned? Patience. It took several years of consistent intellectual stamina before the *Post* became profitable. That kind of interminable enterprise isn't created in five years."

Publisher of the first cyberfeminist zine (www.geekgirl.com.au/), **GEEKGIRL** uses wit, humor, and vitriol to expand women's horizons on the Net. **Modest Witness@Second_Millennium. FemaleMan@Meets_OncoMouse™: Feminism and Technoscience**, by **Donna Haraway**. "Through a wild journey, where a juxtaposition of imagery plays out like a noir sci-fi film made by Tim Burton or Ed Wood, Haraway explores burgeoning technologies and how they might change gender roles. How, for example, will reproductive engineering affect women? My interest, though, is in finding



Ann Winblad



Geekgirl



Henry Massalin

a way out of the gender paradigm so that a woman won't have to be a cyborg to succeed in the next millennium."

After Chernobyl, by **Cornelia Hesse-Honegger**. "This painting documents the invasive threat of unchecked nuclear use with such courage and beauty, it made me ponder why most of us are overwhelmed by life's tragedies. If there's a parallel between Honegger and Haraway, it's that both artists reawakened my mind to things happening on small, invisible scales of change/evolution/revolution. What's scary is that those changes are not all good, but seemingly inevitable."

MicroUnity researcher **HENRY MASSALIN** is a champion of chip tech and well versed on the physics of piggyback rides. (See "Qual" Wired 4.12, page 244.)

Games of No Chance: Combinatorial Games at MSRI, by **Richard J. Nowakowski**. "In a chess match, can you force a win from the first move? Nowakowski broaches questions like this through mathematical analysis. But he doesn't try to reveal answers so much as prove strategic possibilities. The purpose: proof of existence. Sometimes knowing where not to look is just as important as knowing what to look for." **Tuning: Containing the Perfection of Eighteenth-Century Temperament, the Lost Art of Nineteenth-Century Temperament, and the Science of Equal Temperament**, by **Owen H. Jorgensen**. "My skills are long on tech and short on music, so I'm trying to develop better tools for computer-generated music. *Tuning* broaches not only how to tune instruments but also what inspired people to try new methods over the years. Bach and his predecessors, for example, did not use the same tuning standards that we do, and I'd like to re-create their music as it originally sounded."

IT SLEEPS ALONE



A FRUGAL AND ANONYMOUS SCOT, LONG YEARS AGO, observed that the oaken casks which had been used for bringing sherry, port, or madeira into the country, might be employed thereafter to *mature malt whisky*.

A PRIME NOTION IT TURNED OUT TO BE. The casks (particularly those that had contained sherry) imparted both a lustrous golden colour and a beguiling hint of redolence to the malt.

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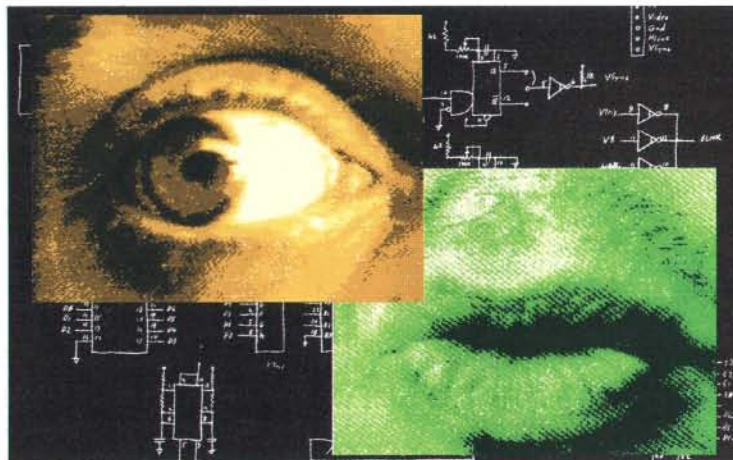
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Body Manipulation

If only I had an extra US\$30,000 to buy a sculpture by engineer-cum-artist Alan Rath! As an art critic and beginning collector, I've long coveted this MIT-educated sculptor's witty commentary on the anthropomorphic nature of machines. Rath's art has been featured at Tokyo's hip Spiral Art Center and New York's prestigious Whitney Museum of American Art; now the San Francisco-based Haines Gallery, in collaboration with Smart Art Press, makes it possible for those with humble collecting budgets like mine to possess a genuine Alan Rath. The gallery is releasing *Virtual Rath*, a limited edition of 750 CD-ROMs, each with four screensavers designed, signed, and numbered by the artist.

This groundbreaking use of the screensaver is an up-to-date version of what art dealers call a "multiple." Think of it as the electronic equivalent of a Picasso lithograph print: less expensive because there isn't one original, but still a valuable, rare piece created by a prominent artist.

Virtual Rath, available for both Macintosh and Windows, comes in a stylized static shield plastic bag, like those normally used for packaging motherboards and chips; it is accompanied by a well-written catalog featuring essays by museum curators, photos of Rath's sculptures,



Affordable art for the screen-savvy.

reproductions of his sketches, and scribbled drafts of computer programs he's authored. Those unfamiliar with the raw aesthetic of Rath's oeuvre can thumb through the catalog to discover that the images appearing onscreen, which can seem "crude" in their faux low resolution, are merely part of a larger work of art: the owner's computer.

Rath's screensaver transforms my utilitarian Mac into a living, breathing sculpture. Like the artist's signature pieces — machinelike creations enlivened with giant eyes and other body parts flashing on screens — *Virtual Rath* features eerie, oversize images of isolated anatomic parts in constant motion. It's more fun than those Rath sculptures in hands-off galleries, precisely because I *can* touch it, interact with it, live with it. I can choose a paranoid eyeball that looks from side to side, a sniffing nose, a mouth that kisses, or a tongue that sticks out and slurps suggestively. I can speed up or slow down the action. I can change the color from yellow to green to black and white. And — something I'd never dare with a \$30,000 sculpture — I can alter it depending on my mood or decor. — *Reena Jana*

Virtual Rath: US\$100. Haines Gallery: +1 (415) 397 8114, email hart41@aol.com.

Maybe Next Newton

I was predisposed to love the Newton MessagePad 2000, which weighs in at less than 2 pounds and has a battery that lasts more than three weeks. So I got a unit, spent a few days loading my data, and seriously tried to integrate it into my workday.

One week in, I gave up using the Newton to take notes. Scribbling on the computer's screen was nearly three times slower than simply typing my notes on a laptop. The MessagePad 2000's keyboard was no better; its size cramped my fingers.

One month in, I stopped using the calendar. The screen was big enough to show only one day at a time with any clarity, making it easy to forget about events two or three days down the line. And the



Still waiting ...

MP2000 was so slow that I started making appointments first, then entering them into the computer later. Not surprisingly, I started double-booking my schedule.

The absence of Ethernet made synchronizing with my desktop computer a pain. The Web browser might be a fun diversion on a six-hour flight, but its lack of support for tables, JavaScript, and animated GIFs made it unsuitable for most applications.

In the end, I gave up on the MP2000. The whole experience left me feeling heartbroken. I hope that the new Newton line better meets my needs. — *Simson Garfinkel*

Newton MessagePad 2000: US\$1,099. Newton: on the Web at www.newton.apple.com/.

Street Cred Contributors

Andrew Cockwell can usually be found around High Park in Toronto.

Eamon Dolan (eamon.dolan@harpercollins.com) edits books in New York and San Francisco.

Simson Garfinkel (simsong@mit.edu) is HotWired's technology columnist.

Harold Goldberg likes owls, love, lust, and literature. He is the author of the novel *Too Many Creeps* and the screenplay *Sensation!*

Phil Gyford (fabius@paranoia.com) is quite tall and looks like a nice kinda fella.

Dan Howland edits the zine *The Journal of Ride Theory* and contemplates spook houses and roller coasters a lot. Too much, really.

Chris Hudak (gametheory@aol.com) crashed the first party *Wired* ever had and has been a regular contributor ever since. News of his exploits at industry parties has been scientifically proven to travel faster than light.

Reena Jana (reena@sirius.com) contributes to *The New York Times Magazine*, *Flash Art*, and *Asian Art News*. She needs constant visual stimulation.

Hari Kunzru (hari@dircon.co.uk) is probably wandering around London's Soho looking for new brands of bottled beer. If you see him, remind him he has to work tomorrow.

Andrew Leonard (aleonard@well.com) is a freelance writer based in Berkeley, California. He specializes in cyber-Asia.

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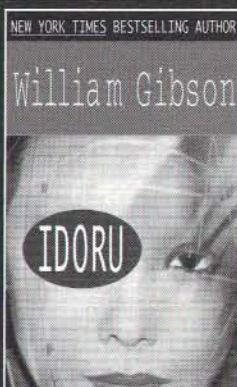
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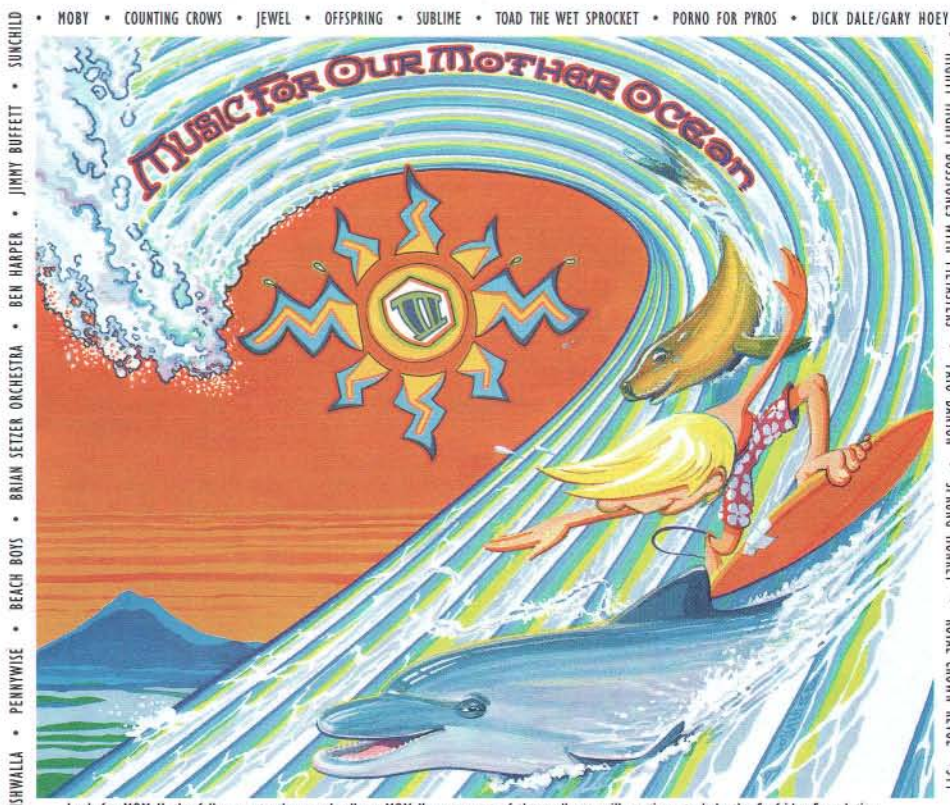
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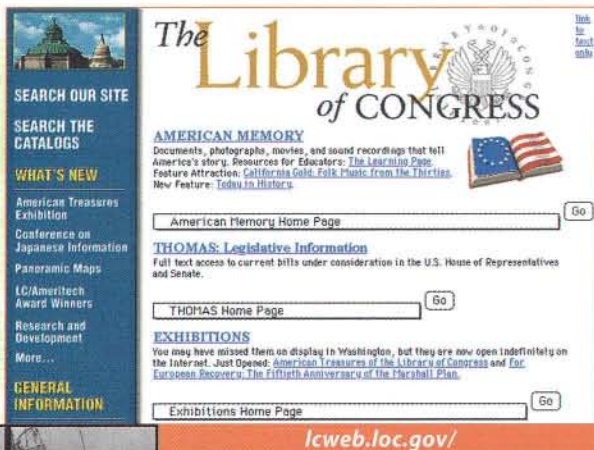
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One Nation's Treasure

Americans exist in a sprawling, sometimes muddled democracy driven by keep-up-with-the-Joneses consumerism. We are, as Howard the Duck once quacked, "trapped in a world we never made." Indeed, I was happy eating my greasy BK Big Fish and reading my lardy Stephen King, utterly at ease with my conspicuous consumption, until I found The Library of Congress Home Page. Though created by the US government, this is a place that goes beyond mogul-ridden democracy to pure infotopia. There's no marketing, no virtual store, no flashing neon banners with cheesy animation. Just endless content. Rampant multimedia. Idyllic Internet. In effect, it's the real Lost World.

Of course, you can't play *Doom* or *Blood* here. But if you dig sniffing among stacks of tomes in attic nooks and crannies, The Library of Congress site mightily satisfies that jones. Wander into the multimedia American Memory, where you'll find a special section on legendary magician Harry Houdini, complete with 143 photos. Step right up for wild, kitschy entertainment, like a charming ad for "the mysteries of the black art"

– accompanied by an image of the handcuffed prestidigitator – in Houdini's own *Conjurers' Monthly*. A few clicks away, a scientist contemplates ectoplasm as it issues from a patient. And somehow the big payoff is getting lost along the way.

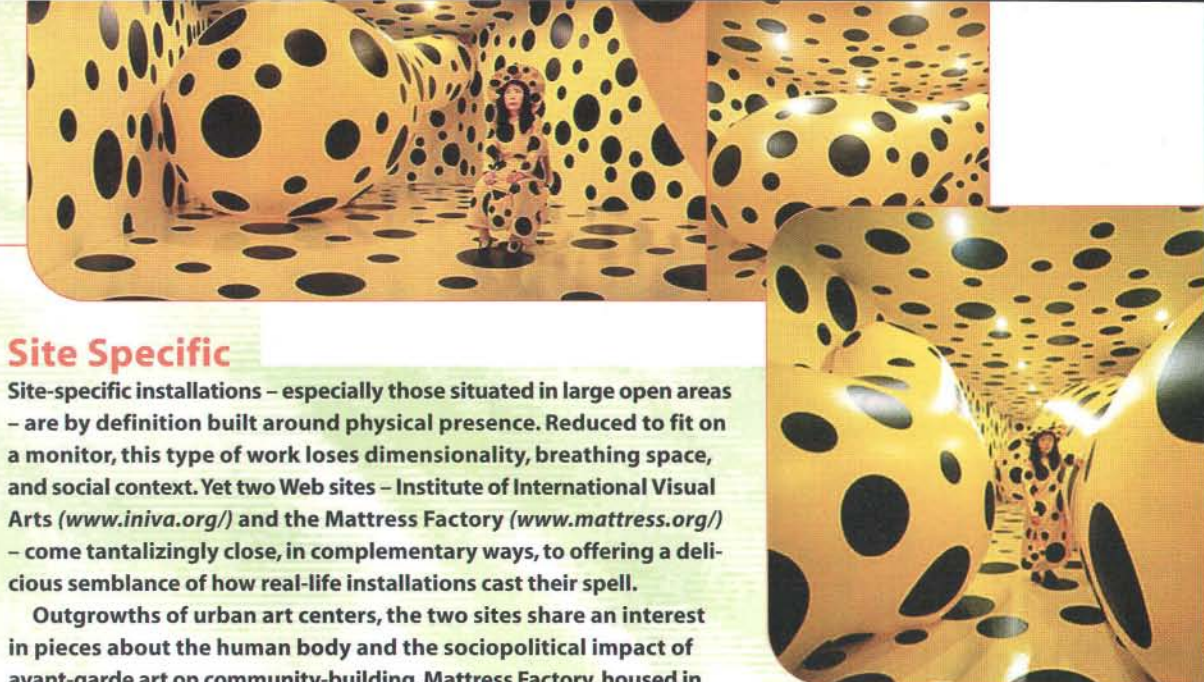
Unlike the self-congratulatory White House page – a marketing tool filled with animated waving flags and ads for Clinton/Gore policy maneuvering – The Library of Congress site is bewitching and well designed, a place that enriches literature and history by putting them in a handsome, hands-on environment. Check out the American Treasures section to digest more than 200 items from Thomas Jefferson's personal library, including a four-page JPEG rough draft of the Declaration of Independence with cross-outs, erasures, and scrawled changes from Adams and Franklin – a spellcheckerless editing nightmare.

Not enough for you? Go research crazy with more than 14 indices, including search tools for the blind and physically challenged. You can download books and documents that often aren't accessible in local libraries or museums due to heavy traffic or pilfering patrons. Print, for example, your own copy of Walt Whitman's earliest

notebooks, wherein the poet writes with a tattered and ugly scrawl – in prose not nearly as momentous and liberating as his great verse – musing about death, souls, and corpses. Peruse Teddy Roosevelt's presidential papers, which include six action-packed pages (filled with florid, anally retentive penmanship) about traveling by sleigh in a snowstorm to see first wife Alice Lee in 1880: you can almost feel the blizzard sting as "the horse plunges to his belly in the great drifts."

The site's ultimate beauty, however, is that it pulls no punches and holds the hype. In American Life Histories, you can pack-rat manuscripts from FDR's all-encompassing Federal Writer's Project, including first-person accounts of life in Oregon during the Great Depression. Sure, there's fluffy stuff, too, everything from local ghost lore to stories about plodding trains. But America wasn't all *Entertainment Tonight* back then. The Library of Congress Home Page is distinctly invaluable for the painless passing on of information. And as the years go by, the publicly and privately funded taxpayer's dream can only grow bigger and better. – Harold Goldberg (mediacur@aol.com)





Site Specific

Site-specific installations – especially those situated in large open areas – are by definition built around physical presence. Reduced to fit on a monitor, this type of work loses dimensionality, breathing space, and social context. Yet two Web sites – Institute of International Visual Arts (www.iniva.org/) and the Mattress Factory (www.mattress.org/) – come tantalizingly close, in complementary ways, to offering a delicious semblance of how real-life installations cast their spell.

Outgrowths of urban art centers, the two sites share an interest in pieces about the human body and the sociopolitical impact of avant-garde art on community-building. Mattress Factory, housed in a Pittsburgh warehouse that was once what its name implies, presents cutting-edge exhibits using a variety of materials in traditional and

digital styles. The London-based Institute of International Visual Arts (inIVA) offers some Shockwave enhanced looks at current exhibits. The Mattress Factory site is populist and breezy in tone; inIVA is rigorously intellectual and literary.

Humor graces both. Multimedia artist Keith Piper's "The Archiving of UnRecorded History" takes a dig at excessive faith in archeology's treatment of tribal history. Meanwhile, Diane Samuels offers photographs of a fictional installation at the Mattress Factory, a virtual play on the virtual nothing that is.

New Frontiers

Want to boldly go where no one has gone before? Though every online travel agency seems to offer an extreme fantasy trip, most of these tours are created by travel agents, not by hardcore sports lovers, so clients end up playing the guinea pig in situations that call for expertise, not exaggeration.

Not so with PeakX, a.k.a. Peak Experience. If you want to take a ski safari through Russia or a rock-climbing trip in Thailand, this is the company for you. Not only do PeakX staffers try out every trip, but their Web site allows you to email trip leaders, past voyagers, and possible fellow travelers. Leave no stone unturned before you go out and turn a few the hard way.

www.peakx.com/

Vampire Girl Seeking ...

Dating in the '90s is a rigorous affair. Everyone has special tastes and needs, and it's often hard to ask for a résumé up front. But, ultimately, it's the same old story: Vampire girl seeks Mordred for a very special Victorian nightmare. Or maybe you want the kind of loving only Marilyn Manson can provide? Can't get enough of those skin-tight black clothes and that whiteface makeup? Want to meet that very special someone who sleeps in a coffin? Check out the Gothic Classifieds, an online dating service dedicated to undying love. It's got blood-dripping graphics and pages of lonely doom fetishists divided by city and country. It's gloomy romance made to order, a veritable gothic buffet.

www.gothic-classifieds.com/

Defacing Bill

While Microsoft morphs into a media company, you can demonstrate your support by morphing Chairman Bill. Actually, it's not so much morphing as defacing and deforming. Thank programmer Alex Rosen, steeped in 100 percent Java, for granting you the sadistic pleasure of kneading the Gates face into an unrecognizable loaf of skin. Think of it as *The Picture of Dorian Gates* and go wild.

www.tiac.net/users/axlrosen/alexwarplarge.html



Dicks-R-Us

When Nikol Lohr lived with her girlfriends in Austin, Texas, they kept a list of all the losers in their lives. As the tab grew and grew, an idea began to materialize – the possibility of a *Consumer Reports*-type service where girls could give the lowdown on the dogs who had done them wrong, perhaps sparing other women the hassle and heartbreak. The Dick List – an online catalog of men whose crimes range from insensitivity to larceny, abuse, and infidelity – was born.

Visitors are encouraged to submit their own Dicks and the details of their misdeeds; eventually Lohr plans to make the site searchable by both name and region. "I get a broad range of women, from teenagers to divorced housewives, who are finally getting a grip on their anger," says Lohr, a 26-year-old Web designer. One entry reads:



Hey Ladies! Look at me! I'm a dick!

THE DICK LIST

www.urbekah.com/housewife/dicks.html

"One. He's my ex-husband. Two. He's psychotic and manipulative. Three. He's marrying my sister."

While many listings include full names, towns, and even phone numbers, Lohr says she doesn't worry about libel, though the threat does stop her from posting some submissions. Besides, it's hard getting a rise out of most of these Dicks.

"I don't think it's one of those things you need to react to," says a Montreal man put on the list by his former girlfriend of seven years. "It seems a little vengeful and a bit pointless." As the site maintains, "No Dick is too small to submit."



Natalie Demontigny

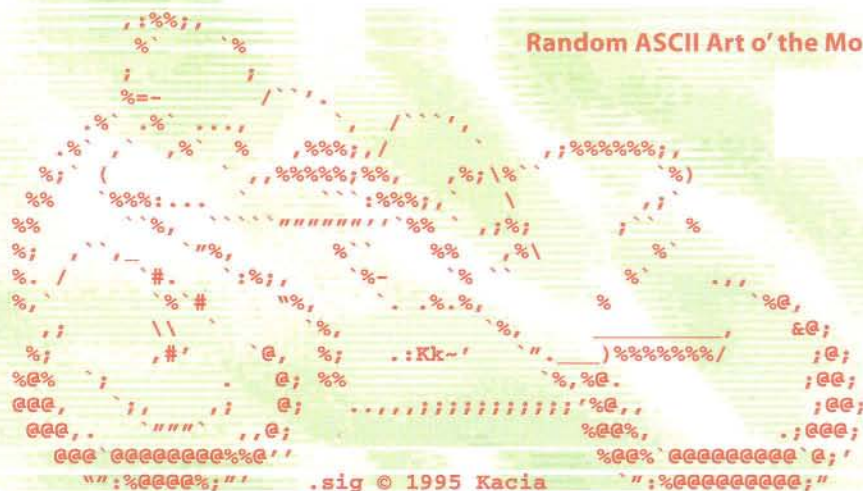
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them a phony "Way Cool 3.5%" Web site prize. Those who prefer more elaborate tricks can send a "real" letter (anything from a stool sample request to a ticket for violating carpool lane rules) to friends and/or enemies for a nominal fee. Who says cruelty can't be fun?

www.aprilfools.com/

Thanks to the Wired 5.09 Surf Team

Thomas Claburn (tom@wired.com) ■ Michelle Goldberg (goldberg@rosebud.berkeley.edu)

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Riven

◀ 127 The brothers were fighting, the rumors said. There had been a falling out. I felt oddly delicate about pursuing the rumors, as though the glare of my media attention might make a bad situation worse.

I wasn't really protective of the Millers; I was protective of *Riven*. I wanted to see it finished. I was exhibiting codependent behavior with a computer game.

The office was open and casual; badges were not required; all the rooms were left unlocked. I would sit in empty chairs staring at people's family photos. Eventually I got bored and leaned against the door-jamb of Rand's office. He waved me in; the room was tiny and almost entirely unornamented. Rand is the older brother, the one who was working as a programmer in a bank in Texas when the brothers' idea for Cyan first emerged. It had seemed to me all along that, in a sense, Cyan was a tree house Rand had built for his little brother.

Myst II was more than "eagerly awaited." It was as if the Millers were expected to cure cancer.

Robyn needed a venue; he needed an older brother's steadying hand. Robyn had been in Seattle, not going to class, drawing weird pictures, playing weird tunes; it was best for all concerned that his energies be channeled, as one might say, initially into the first Cyan games (*The Manhole* and *Cosmic Osmo*) and then into Channelwood and all the lands of *Myst*.

This was my speculation purely, and partly it was a process of elimination – Rand had said enough times that *it all didn't really matter, not any of it*, and that his priorities were elsewhere, by which he meant his wife and his children and the double-wide trailer where he lived on 20 acres of land at the end of a dirt road so far out of town that the moss grows on the south side of the trees, and by which he meant also the Lord Jesus Christ, about whom Rand will talk only when asked. You can bet he doesn't get asked much at the big software conventions, just as you can be sure they think he's joking when he talks about his double-wide. But it's not

a joke, not any of it. "So suppose," I said, "that this project does not get finished in time for Christmas of 1996. How big is the trouble you'd be in?"

He smiled blandly. He has a poker player's face, open and guileless and opaque. When he didn't want to answer a question, he'd answer it anyway, in fine genial sentences that, when unpacked, turned out to mean precisely nothing. He was a wheels-within-wheels sort of guy, a *Myst* Island sort of guy. The buttons are all hidden.

"We expect to have it ready on time."

"Of course you do."

"We'd be disappointed if it were not ready on time."

"It's only natural."

"But we didn't take any money from Broderbund, you see. We're living entirely off the profits from *Myst*. So we're not beholden." He liked that word; he said it again. "Beholden. Our primary thing is to make this the best game that it can be. That is our only motivation, really. We want to be as cooperative with

Dorothea Lange photo). In step beside us was Richard Vander Wende, whose title was vice president/creative director, and whose true function was to be the wild card, the new guy, the man who would take *Myst II* to the next level, take it to the *Riven* level.

He was the first break with the past, the first not named Miller to be placed at the heart of the project. He was the atheist who'd been given the keys to the kingdom.

We ate at the Red Robin, a stereotype-busting Spokane strip mall lunch joint, where the burgers could be made with chicken instead of beef if that was your preference, and iced tea with ginseng and mocha shakes made with actual coffee were available. It's the '90s everywhere in America now, and our culture has caught up with itself in unexpected ways, plus – this is an absolute feature of Spokane in my experience, almost a legal requirement – real friendly waitresses. Just ... unnaturally friendly.

I sat across from Richard and just stared. He looked like an El Greco saint. His face was long and pale; his dark eyes sat like coals under his blank brow. He had no use for small talk; he had no use for me. He understood that dealing with the press was going to be part of his lot, but this was one of his first encounters and he looked forward to it as he would to gall bladder surgery. He would let the silences go on and on as he considered the answer to a question; he would rub his forefinger behind his left ear as though massaging the words out of the occipital lobe, and often the answer would be "Yes," which is not exactly a great quote.

Still, the story emerged. He had met Rand and Robyn at Digital World Expo in Los Angeles. He had just come off four years of working on *Aladdin* for Disney; he was unemployed and looking for a change. He was looking for a challenge. He was not looking for Spokane, but the more he talked with Robyn, the more he realized that he had found ... a soul mate? Not quite. A collaborator? Almost certainly. A job? Absolutely.

Richard's specialty was production design, with some additional expertise in and enthusiasm for animation, and animation was what the Millers decided *Riven* must have. *Jurassic Park* had changed the playing field for computer-generated 172 ►

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Riven

◀ 170 imagery; anything as ambitious as *Riven* had to assume that the audience had changed. Not that Cyan had anything like a Spielberg budget, not that a CD-ROM had anything like the power to allow full-screen velociraptors to engage in intricate maneuvers, but the bar had been raised. Robyn and Richard began talking about pushing the envelope. They began sketching things. As they talked, they realized they both admired the *Star Wars* movies and, unexpectedly, *Brazil*, the Terry Gilliam masterpiece of industrial alienation. Those would be the touchstones of *Riven*, that and a whole lot of elegant programming and modeling and animation and, oh yes, live action. Lots more live actors. Richard could direct, maybe.

I asked him if he'd seen *Myst* before he met the Millers. "Oh sure. I loved it; everybody loved it." He threw in one of his pauses. "But so much has changed. So much more is possible. Not everything in

concept of the imperfect *Myst*. I had asked for this story in the first place because I was an unabashed fan; the piece I wrote for *Wired* 2.08 was a straight puff piece – intelligent, informed, delicate puffery, I like to think, but an A-1 humjob just the same. And so I considered the flaws in *Myst*, guided by Richard's words. I asked the game to justify itself. Were we supposed to believe, for instance, that Atrus and Catherine lived for two decades on Myst Island with their two psychotic youngsters? Atrus in his creepy library all day with its even creepier basement; Catherine puttering in the cabin, dreading another cold snap because then she would have to turn on the heater and the damn tree would thunder boom-Boom-BOOM again – what kind of life was that? No bathrooms, no rubbish bins? Where were the middens? And even off Myst Island – Channelwood seemed to be a reasonably complete land, but Stoneship was, well, a ship in a stone. That's a whole age? One ship that didn't go anywhere?

Myst had its problems. An entire age about a ship in stone that didn't go anywhere?

Myst was perfect. I mean, that's clear."

I looked at Rand to see how that sentiment was playing. "Absolutely," he said. "It was very good for when it was and what it was, but even when we finally shipped it there were parts we didn't like."

"It didn't make sense sometimes," said Richard. "It was all very cool, but it didn't make sense." (A year later, Robyn would tell me: "I'm thinking of it now like Tolkien. First he did *The Hobbit*, which revealed to him the possibilities of creating a world. So then he did *Lord of the Rings*, which was infinitely richer and bigger and more held-together. It made more sense. *Riven* is our *Lord of the Rings*. I don't mean as good as, I mean that's its relationship with *Myst*.")

Rand nodded. "We all feel like that. *Myst* is what it is. It could have been better. This has to be better."

"It has to be better real quick," I said.

Rand smiled blandly. "Of course."

Richard's finger massaged his scalp.

On the plane home I considered the

I remembered that Channelwood had been built last; it was the part of *Myst* that made Robyn most proud. There was a sense in Channelwood that a real civilization had grown up there; that its eeriness was deeper and denser than the all-you-can-eat surf-and-turf high-spook combination of *Popular Mechanics* and *Scooby Doo* that lay close to the heart of the *Myst* Island experience.

But there was more than that. I had asked Richard in several ways what he thought he brought to Cyan; he gave me several answers, all of them hesitant, some of them almost whispered. One time he said that Robyn had wanted to make the characters very much black and white, either entirely good or entirely evil.

"But it seemed to me," Richard had said, "that the players should take responsibility for their judgments. The choices shouldn't be so easy. They should have to decide what their values are. That's the point of its being interactive; as a designer, you have that freedom." The introduction of

free will into the predetermined universe of computer games – that's the Holy Grail. Other software designers have speculated that some sort of AI entity was needed, some botlike program that would allow the game to re-create itself according to the actions of the player. But Richard wasn't talking about that. He was talking about using the force of narrative to create the seamless illusion of free will, the way the force of narrative creates the illusion of death and resurrection. Great tragedy had that – the illusion of free will combined with inevitability of consequences, the certainty of a death foretold. Suppose it wasn't a technofix that took things to the next level. Suppose it was imagination.

November 1996: A British actor in a Cos-sack uniform stood in a blue room. He fidgeted with an object that looked like a cross between a cane and a pogo stick. He talked about his last job doing a commercial for Birds Eye frozen meals.

"One day it will be computer actors," said Rand.

"They'll still be actors," said John Keston, the actor, thin as a stick, gaunt, and over 70. "Even if it's computer-generated, it'll be a model of an actor. There will be an actor somewhere."

"Or a programmer," said Rand, gently, not baiting him.

"If it's a programmer, then he'll be the actor," said Keston.

Rand thought about that. "He'll still be pretending," he said finally. "I'm not sure that's the same thing."

But of course it is. People pretending is at the heart of all art, and a programmer is pretending the same way a choreographer is pretending. Or a director. And taking the pretending seriously while remembering that it's pretending is the psychological challenge that faces all artists. Or so it says in my notes. There's a lot of waiting on a movie set, even if the movie in fact has more than 1,000 fragments (some minutes long and some hardly more than a second) to be dropped seamlessly into the world's most anticipated CD-ROM, now officially scheduled for release in summer 1997.

I asked Rand whether they would meet that deadline. "Define summer," he said.

"Long days, warm nights, baseball, corn on the cob."

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Riven

◀ 172 "Is September summer?"

"In San Francisco it is."

"We might make September. We're trying real hard for September."

More than that he would not say. The shipping date had never been "official," anyway. The creative challenges had proved more challenging than had been anticipated. Everyone at Broderbund had been very supportive.

"They pretty much had to be, didn't they? They didn't have a lot of leverage."

"What they think is very important to us."

"For a simple country boy, you sound a lot like a press release."

"I am very happy to be in your lovely city," he said.

The city was San Francisco. The blue room was part of a process called blue screen, which involves putting actors in CGI settings, the blue becoming invisible by a process I cannot begin to explain. It's old technology, anyway; every weather-

seen by the Millers (much like the subcontractors overseen by George Lucas) have created a backstory, a time before the beginning of *Myst*, and the past impinges upon and defines the future. The books themselves are standard-issue spin-off prose, as clunky and banal as the games are graceful and sophisticated, but they're still part of the universe. This shadow world forms an aesthetic paradox that no one quite wants to deal with, because the hardcore fans are vital to the success of *Riven*; they'll provide the Internet with the first word of mouth – and they can be intemperate in their disappointment. For the record: Gehn is the father of Atrus, who is the old guy in the cave at the end of *Myst*, also the guy who wrote all the journals in the library. Catherine – her name appears on a note, her corporeal presence not at all – is the wife of Atrus. Atrus is played in *Myst* by Rand Miller.

Gehn is also the son of Aitrus, another Aitrus, whose *i* was added late in the game to avoid the confusion you may be feeling.

will be newsgroup hell to pay.

No wonder Richard looked like death. This was the first time he'd ever directed live actors; he was as tightly strung as a violin wire. Rand was not much better – the demands of the plot were such that he had to reprise his role as Atrus. He had to sit in his rocky den, where the last game ended, and tell the players to charge forth into the world of Gehn and Catherine, into *Riven*. He hated acting. He had no choice but to act. It was like a Beckett play.

Robyn was not even there. Sometime between April and November there had been a certain division of responsibility. Some clarity had been achieved about the relation between art and commerce. Some things had been delegated. Robyn was up overseeing the building of the world of *Riven*, the actual CGI backdrops, thousands of them, that would pop up around every corner, each vista more breathtaking than the last, more mysterious, more suggestive, more complete. In a sense, Robyn was the victim of his own success, the man who reinvented computer games being asked to do it again.

Which was unfair. Any artist has only one revolution within him. After Shakespeare wrote *Hamlet*, he didn't write *A Doll's House* or *Endgame*; he wrote *Othello* and *Macbeth* and *King Lear*. He may have dragged Western drama to a new level, but he didn't drag it to a new level every time out; it was his body of work that redefined the depth and subtlety of what a mere play could achieve. And yet the fans out there were expecting another revolution, something as profoundly shocking as *Myst* had been. And of course they wouldn't get it – same guy, same brain, only so much inspiration is allotted even at the high end of the scale.

I had tried to find Christian allegories in the stories of *Myst* and *Riven*; nothing obvious popped up. Both stories are about people who create worlds; both stories are about the moral seriousness required to embark on the task of creating worlds. So perhaps both games are about God, although they could equally well be autobiographical, since Rand and Robyn are themselves creators of worlds. I couldn't find Jesus anywhere (unless the player of the game is Jesus, come from outside time to save the world), and eventually I abandoned that line of thought. Sometimes a

When I first visited, something was definitely wrong. No one was happy, Robyn was absent.

caster in the Lower 48 stands in front of a blue screen, pointing at nothing while checking the map on the monitor.

John Keston had been hired to play Gehn, a name familiar to you only if you are a total *Myst* buff, a reader of the *Myst* novels. Yes, while you were off playing *Civilization II* or *Warcraft* and wondering if *Myst II* would ever be a reality, novels were coming out. *Myst: The Book of Atrus* sold 100,000 copies in hardcover and another 200,000 in paperback; *Myst: The Book of Ti'ana* sold a like number in hardback and will come out in paper very soon; a third book, *Myst: The Book of D'ni* is due for release at the same time as *Riven*. The first two books move backward in time, each a prequel to the last, even as the games are moving forward in time, *Riven* being a sequel to *Myst*.

The world of *Myst* is now as circumscribed by subsidiary media as the world of *Star Wars*. *Myst* is a science fiction phenomenon as much as it is a computer game phenomenon. Subcontractors over-

Aitrus the Elder was married to Anna, who raised her grandson Atrus in a place called The Cleft. Meanwhile, Gehn was down in D'ni (pronounced "DUH-nee"), the great underground ruins of the ancient race who created the linking books. Gehn has learned the art of making linking books. There was a struggle between Gehn and Atrus, father and son, as told in *Myst: The Book of Atrus*, and there's all sorts of strange hoo-ha, including the creation of Myst Island by Anna and Catherine, and finally, in *Riven*, the story continues.

It's all another kind of straitjacket, another thing for the game designers to worry about. There is D'ni language, written and spoken. There is an elaborate social structure. There are customs, inventions, plans, history. And people *care* about it, so that if the Fifth Age of Gehn is not like it was in the book, if Catherine is not as she was, if the fire marbles don't look right and the runic inscription on the wall says "Eat big snails, Bill Gates" instead of "Only the wise man enters J'Taeri," there

fire marble is just a fire marble, as Freud might have remarked.

I sat there thinking thoughts and noticing how cold it was. This story was reported in mittens. Richard huddled palely. Rand ducked into corners, whispered in his cellular phone. Tim Greenberg, an artist who worked closely with Richard, sweated the details. No reshooting was allowed. Whatever they got that week went into the game. *Riven* was designed as a game with many endings. There was only one magnificent sound-the-trumpets, victory-is-ours ending, but there were other endings, too, some of them mere cul-de-sacs. You could get some parts right but not others, and some good things would happen, but not all the good things. And of course there were really bad endings, too, where evil triumphed and you languished in a dark dungeon for eternity. (Like *Myst*, *Riven* is a game essentially without death - only banishment.) And there were really unlikely endings, things that only some obsessive game fan would try: "I'll bet they haven't thought of *this*," the fan would say, and lo and behold, there would be Gehn, saying, "Tut, tut."

So in addition to it being bigger, more coherent, and true to the intricacies of the D'ni culture - and in stores by September - *Riven* had to outthink every game guy on the planet. Perfect. Lacking anything else to do, I interviewed John Keston. Turned out he was a classically trained British actor and singer who was also the over-70 marathon champion, having run that distance in 3:00:58. He hoped to break three hours at least once before he died; he described his theories of training in some detail. He was not entirely clear what *Myst* was. He understood it was popular. He liked everybody very much.

April 1997: We were back at the Red Robin. Complete turnout this time: Rand, Robyn, Richard, me, and Kevin Kelly, an editor of this very magazine. Everybody was in a real good mood. The waitress was wearing a large button that said "Burgers of the Universe." On the button was a buttonlike representation of the universe in purple and black; in the middle a tiny red light blinked on and off.

"Great button," I said.

"Yes, indeed," said Rand.

"You want some?" asked the waitress.

"Sure," said Robyn. She went away and returned with a handful, enough for all of us. "Put 'em away," she whispered. "I really shouldn't be doing this."

"They know me here," said Rand.

"So is that your newfound celebrity?"

I asked. "Illicit buttons at the Red Robin?"

Rand looked at me. "We run a tab here."

"You're one step away from Eurotrash,"

I said.

Something had happened in five months. Perhaps the famous feud had been resolved, the famous feud that had hung so heavily in the air before. Maybe it was just a matter of timing, of the end being finally in sight, of a shared belief that they would meet the September deadline, and the game really would be on the shelves October 1. They'd had a run-through that they'd prepared for Broderbund; they'd had a zip-wowie-bam preview on videotape that they'd played at the TED conference; they still needed to beta the gameplay and render a few more objects and get all the animation in place and, oh yeah, the very end was not quite finished, but all things were possible. *Riven* was almost real. They believed again. They believed that it was good; they believed that it was over.

Both of those things were important.

After lunch, we drove back to the spanking new Cyan World Headquarters, 10,000 square feet of big-time software magnate fun, the chief extravagance of the much-richer-than-before Millers. *Myst* had by that point surpassed *Doom* as the Number One game of all time. The front portal was a large gate with surrounding brickwork that looked as though it had slid forward on hidden hydraulics. The mortar between the bricks looked old and crumbly; the repeated shape on the building beyond looked equally ancient. A bridge led across a dry moat; just inside the door, a large rusty lever, like the hand brake of an ancient threshing machine, seemed poised to bring the portal back to the building again, protecting Cyan World Headquarters from invaders.

It looked a little like a proposed design for the entrance to a *Myst* theme park - and the theme park idea had indeed crossed several minds at Cyan.

Behind the building was a planted hillside with a slow easy waterfall and lots 176 ▶

The URLs

Cyan homepage
www.cyan.com/



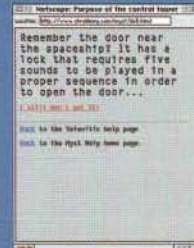
Mystique: The Myst Fan Club Home Page
www.bekkoame.or.jp/~mystique/



Riven Unofficial Home Page
members.aol.com/mystsequel/index.html



The Myst Hint Guide
www.shrubbery.com/myst/index.html



The Circle of D'ni
www.artech.se/~strndbrg/



The Key Characters

MYST

ATRUS A consummate "writer" with the ability to conjure worlds – literally – from words, Atrus is the author of *Myst* Island and the keeper of an amazing library. All but four of his books have been destroyed, and he fears one of his sons is to blame. Atrus's mystery unfolds through a series of clues left on the island.

SIRRUS AND ACHENAR Sons of Atrus and Catherine, they have been imprisoned in books written by their suspicious father. Bound within their respective worlds until you set them free, each crafty brother employs wit and guile to convince you of his innocence and the other's guilt.

RIVEN

GEHN The father of Atrus, Gehn is also a "writer." Unlike Atrus, Gehn has developed a bit of a God complex for which his son has confined him to Riven – an Age of Gehn's own creation – and stripped him of his power. He has been trapped for more than 30 years when the story begins.

CATHERINE Born on Riven, the ethereal and intuitive Catherine is a misfit among her kin. She has been deceived into returning to her homeland, where she, too, becomes trapped.

ATRUS His worst fears are realized when Riven is torn asunder by age-old conflicts, intrigue, and betrayal. His mission for the player: discover the truth about Riven before it is too late.

Riven

◀ 175 of rocks for sitting. Cyan had family barbecues there every so often, and maybe in summer people ate lunch there, too. It was of course cold again, and the only outside activities I witnessed were the twice-daily games of frisbee golf among the more vigorous employees. Inside the building was mostly unornamented and functional, with open cubicles in the Silicon Valley style. Downstairs, though, in the art department, the crumbling brickwork motif was picked up again. There's a fake planetarium in the center of the room with an ovoid bench just for hanging out. I never saw anyone hanging out there – the bench is spectacularly uncomfortable – but designing playhouses is a tough job. Maybe it's enough if something looks cool.

Almost all the rest of the *Myst* money went into the necessities of the business, including four SGI Challenge L servers, which were already so maxed when I saw them that there are probably five by now. The 3-D rendering software needs a lot of tweaking, too, because the ambitions of *Riven* were far greater than anything Softimage (pronounced "sof-tim-AHGE") was capable of. Indeed, Cyan employees wrote many new programs, most notably code for something called "shaders," although they do not necessarily shade anything. Two employees quit Cyan toward the end of the *Riven* project to produce advanced shader technology in a separate company. Oh, and Rand got a new truck.

The decision to not take Broderbund's money with the big strings attached was great for artistic freedom, but it didn't exactly improve the cash flow. If demand for *Myst* had suddenly plummeted, there could have been even more trouble. But it didn't, and there wasn't, and *Riven* was almost done.

I stopped by Bonnie's desk on the way in; we nodded conspiratorially. She looked happy again; even better, she looked warm. She asked me how lunch was, and I said it was fine, and we understood that fine was good, and better than before. She told me that she and her husband Josh had just bought a house out near the new high school. She told me what she paid for it.

Chickenburgers, ginseng, clear mountain air, and huge houses for next to noth-

ing – Spokane! I couldn't get away from dealing with the town; it kept coming up. I couldn't decide whether I just noticed it because I was a stranger, or whether everyone in the office was wrestling with it on their own terms. The natives were living much as before, Rand with his wife and three daughters; Robyn with his wife and growing family (one infant, one adopted child 18 months old, plus an older son); their mother and father close by for frequent family gatherings. Dad was still pastor at Northview Bible Church, where Rand worked with youth groups. The town is surrounded by wilderness or close to it; backcountry enclaves and lonely ridgelines. When you're eating a chickenburger, Spokane can seem like just another part of America, but in fact it's close to the end of the national earth, a frontier village with its own rules, friendly and suspicious both.

And the work ethic dominated in the village. Whatever fantasies the huge influx of cash might have stirred in the Miller bosoms, they had been resisted, at least until now. The focus was on *Riven*.

The Millers, Richard, Kevin, and I sat in the conference room and talked; two of us were wearing our "Burgers of the Universe" buttons. Kevin mostly asked the questions. I drifted some, aware that I would have my own chance. My universal burger had made me sleepy.

I remember Richard talking about Walt Disney. He had a fascination with the man and a fascination with the company; he felt as though he had left more of himself there than he had wanted, had squandered too much emotional capital on what was in the end just *Aladdin*, another product with no context, no admirers, and centuries of shelf life.

Everyone had told Walt not to do Disneyland. Big money sink, people had said. Big mistake. If you build it, they will stay away. But he did build it, and it was wonderful, and *nobody copied it*. For two decades, there was nothing else remotely as good as Disneyland; even today, there's nothing as good as Disneyland.

Richard made that analogy to *Myst*. And he had a curious complaint: Where are the knockoffs? If we're the best, why isn't anyone stealing from us? They kept checking through the new releases, waiting

for the obvious copy – nothing came. *Doom*; yup, plenty of *Doom* copies. No successful *Myst* copies. If imitation is the sincerest form of flattery, where's the flattery? Three point five million units sold – where's the flattery?

Asked to define what they were doing, Rand used the phrase “immersive environments.” None of them liked the word *game* anymore, because a game could be anything. Checkers is a game; *Riven* is an immersive environment. And the environment, said Richard, had to be “familiar and strange.” You had to feel that you had seen it before; you had to know that you had never seen it before. Robyn talked about how the world of *Riven* was both highly mechanical and highly organic. “You know the inside of the *Millennium Falcon*? You know how jumbled that all is, how thrown-together? It was a whole new kind of spaceship. That's the idea.”

“I like a lot of corrosion,” said Richard. “I like the color; I like the feel. It's a great harmonizer; it makes everything more accessible.”

Above the conference table was a big log suspended by metal straps. It might have been an ornamental battering ram. The wood looked newly stripped, almost blond. I wondered if it were inviting in the same way that corrosion is inviting. I wondered how many adjectives could describe the aesthetic Richard was outlining: old not new, rough not smooth, round not sharp, mottled not slick. I wondered how tightly secured the log was, and who it would kill if it fell. I wondered if perhaps certain executives from Broderbund were required to sit under the log in any conversation in which the phrase “inevitable delays” was used.

Kevin was talking to Robyn about Christianity, a passion they share. Robyn expressed impatience with his co-religionists, at those in the small fundamentalist community in Spokane of which he was a member. “I find a resistance to art and science. It's very annoying. It's very blind. That's not in the Bible, not in any Bible that I've read. In other ages, Christians were at the forefront of science, the forefront of art. Now every one is so ‘Oh no no no, why are you doing that?’”

So there was another pressure point, one that became more evident when the

mood was calmer, when the deadline was doable: it's hard to work without the support of the people you care about, when what you're most passionate about was seen as a vocation somewhere between silly and dangerous. The isolation that helped so much in the first game, that made the Millers unaware of what was impossible or undesirable, too sophisticated or too quiet, was now beginning to grate a little. Spokane again, the unseen guest in so many rooms. The Millers don't really fit anywhere; they're like some wandering clan, better at the urban arts than the slickers, but rooted in the country, in an enclave, misunderstood and admired.

Must be lonely, up in Spokane, unsure of what the world thinks, all too sure of what your neighbors think. Must be like *Myst* Island, with the seagulls and the gears on the hill. Kevin left that afternoon. My hotel was in downtown Spokane; the spring rains plus the early snowmelt were making the river outside my window a surging torrent. It was a landscape I understood; I was

when Spokane was still friendly, back when ... but then nostalgia will crowd out memory, nostalgia and regret and fear, and the vista itself will vanish.

Maybe an “immersive environment” is nothing more than a story we tell ourselves about what we could have been.

Took me 20 minutes to get back to Cyan; by 10 a.m. I sat down and Rand punched a few buttons and there I was in *Riven*. It is unmistakably a *Myst* universe. There are elevators, walkways, tunnels, valves, and power plants, some functional, some not. There are machines that rotate; there are pulleys and levers. There are pipes; many, many pipes. The landscape is vaguely volcanic, with lakes in craters, sudden precipices, unexpected fissures. Over it all is a brooding sense of obsession.

Richard had told me about a book called *The Power of Limits: Proportional Harmonies in Nature, Art, and Architecture* by Gyorgy Doczi. It's an investigation of the repetition of certain proportional patterns in nature, a view of the world so narrow

There were rumors that the brothers were fighting and that deadlines had been blown.

raised in the west, too, and even in the cities nature was not far away.

The next morning I drove the long way to Cyan World Headquarters. I'd been on the same roads three years ago, wandering through the wheat fields looking for Robyn's house, carrying a set of directions that included the admonition “turn right at the Grange Hall.”

The place was changing. There was a cluster of townhouses close to the main road; around the first turn, acres of cleared land with red flags marking property lines. There were silent bulldozers parked on gentle hills. Further, the new Mount Spokane High School was almost complete. There are more of us everywhere, and we own the earth, that's what the red flags meant. Within a generation, this vista – the one you could still see if you got far enough back and blocked out the high school with your hand – would be almost entirely forgotten even by the people who once walked by it every day. They'll see a photo and say, yes, I remember, back

and intense it's almost mad. Doczi sets out to prove that everything harmonizes with his ideal shape. Those artifacts that do not so harmonize are evil or misguided or both. Somewhere in *Riven*, in time past or time present, there was or is a being just a little like Gyorgy Doczi. This person (to identify him/her more clearly would be to hint at the secrets of the game) was certainly unreliable; he was arguably nuts; but he was true to his obsession, and clever in finding patterns. One of the things that *Riven* forces you to do is consider the nature of obsession, because it is necessary to figure out the logic behind the looniness.

That's the real game in *Riven*. There are puzzles, much more varied than before, and more numerous. (“The two complaints about *Myst*,” said Rand, “was that it was too hard and too easy. We're trying to make *Riven* better for both kinds of players.”) The puzzles are maddening and specific in a way that will seem very familiar to *Myst* fans. But the puzzles are not the mystery. People who do not like puzzles like to 178 ►

Riven

◀ 177 wander around *Myst*. There's a lot more of *Riven* to wander around (they're trying to bring it in at five CD-ROMs), and a lot more to see, and a lot more operatic spectacle. There's more variety of scale, more complexity of function. And everything is a clue. *Riven* is not unpopulated.

About a year later, everything had changed. They believed again the end was in sight.

There is a culture there, and the nature of the culture is the nature of the basic mystery. Solve one, solve the other.

It's very late Victorian – like Jules Verne, whose *The Mysterious Island* gave *Myst* its name; like Tolkien, a late Victorian trapped in the 20th century. It was the age that created the amateur detective – Sherlock Holmes is Victorian to his fingertips – and celebrated the amateur adventurer, Sir Richard Burton and Mungo Park and both Stanley and Livingstone. The look

of the machines in *Riven* might have come straight out of the railway museum in London, all gewgaws and filigrees with the works themselves open for inspection, like one of those pocket watches with the glass backs. And the impulse that drives the game is Victorian, too. The player must be a talented amateur archeologist. The player must view every artifact and

strives for believability rather than comic effect. Richard was fascinated by that stuff; almost everyone at Cyan had described Richard's house as being littered with intact animal skeletons, like geometric notations of life itself.

Not that the animals found in *Riven* can also be found on Earth. They are new species. One is a combination of a whale and a shark (in-house name: wahrk); one is a sort of thin walrus with the long, Loch Ness-monster-like neck (in-house name: hippoheimer); one is a useful, froglike creature (in-house name: ytram).

The origin of the ytram deserves its own paragraph. In the first days after Richard arrived at Cyan, when Chris Brandkamp's garage was still serving as world headquarters, there was an annoying frog living behind the drywall next to Richard's desk. Also, there were constant phone calls from a guy named Marty O'Donnell, who kept bugging the Millers about doing sound effects for *Riven*. He was a nice guy and all; he was also a pest. So when the guys were searching for a convenient name to call *Riven*'s not-frogs, Richard suggested

ask, "What is that for? What does it do? Which physical principles are being employed? What biological urge is being served?" Speculation is not just encouraged; speculation is necessary.

There are also animals. One reason that Richard was such a perfect fit for Cyan is his work at Disney; it had been clear to Robyn all along that the next *Myst* had to have animation. Not animation like Mickey Mouse, but animation like *Jurassic Park*, which uses the same principles but

Ground Zero For The Brain.

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gram, which is *Marty* backward. Marty knows about all this and thinks it's funny; says he does, anyway. PS: He got the job.

The animals are more than pleasing distractions. The world of *Riven* is very much a deist world; everything is there for a reason. God does not play dice with the universe. Deist and dualist, too – the word *riven* means “split apart.” Atrus, whose instructions set the game in motion, comes from The Cleft. There is light and darkness, the seen and the unseen. Behind it all, there is a hidden struggle where fissures are both paths and clues.

Myst's famous textures are improved in *Riven*. Because of the teeny technology that *Myst* used and the Mac's limited memory, a lot of the textures were tiled – that is, created and then repeated over and over. The praise that the richness of surfaces in *Myst* received was mostly a function of the poverty of the competition. But in *Riven*, there is little tiling. Many of the textures were scanned in from a three-day photo trip to Santa Fe taken by Robyn, Richard, and Cyan graphic artist Josh Staub. They found the rock surfaces, washed adobe

walls, and twisted tree bark irresistible; they also found junkyards filled with machinery that was corroded in the desirable manner. Once scanned, the surfaces were manipulated in ways that I am not competent to describe. As an example, the palm of Richard's hand was scanned in and then manipulated to make the “leather” for a bed cover.

These textures were then wrapped around modeled three-dimensional objects created using Softimage. The models onscreen look as though they

tiny straight lines to describe curved objects – using such lines creates that “computer art” feel that destroys the carefully composed reality of the images.

Riven's music, like that in *Myst*, was entirely composed and performed by Robyn, using three synthesizers. The music was one of the last things to be laid in; most of the game I saw was silent. In *Myst*, the same music plays in the same way every time a player enters a room or scene. Robyn thought some of the repeated music in *Myst* was annoying, so in *Riven*,

Rand punched some keys, and there I was inside *Riven*, very much a *Myst* universe.

had been created out of chicken wire. The jargon for the shapes of these three-dimensional objects is “the geometry.” There are also “patch objects,” which are created by manipulating “splines,” which are curved lines that can be used to describe complex shapes. Splines allow designers to get away from using lots of

the game remembers if you've been there before, and gives you a stripped-down version of the melody.

What else? Four thousand images, more or less. Two hours of film, not counting the simple animations, like valves turning. The number of polygons in the game is uncertain – polygons being the building 180 ►

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Riven

◀ 179 blocks of CGI – maybe 10 million, maybe twice that. There are a few inside jokes in the game. The basalt towers found everywhere in *Riven* are also found everywhere around Spokane. Cropping up like sentinels along freeway off-ramps. Late in the game, in a curious context, Richard's wife Katherine appears in a surprising speaking role. Except for Rand's Atrus, all the other performers are hired actors, none famous. Like *Myst*, only more so, *Riven* is insanely overgenerous with its images. It's profligate, brazen, unnecessary; you can sense why it took so long, why the Millers renounced up-front money to do it right. It's a gift that borders on obsession; it makes you grateful and nervous at the same time.

I saw all there was to see. I got up from my chair; I stumbled around the offices in that numbed stage where the mouse finger clicks every time the eye fastens on something. I do not have an opinion about the

Riven is insanely overgenerous with its images. It's a gift that borders on obsession.

commercial possibilities of *Riven*. That depends on the what the market wants, where the market is, price sensitivity and box design and the state of the economy. I think though, that *Riven* fulfills the promise of *Myst*. They kept their word. Whether anyone remembers the vow ... well, that's show biz. Not everyone knows about Tolkien; not everybody cares.

It grew late. I interviewed the three men separately one more time. I asked them each the same two questions. Rand was first. His office was upstairs; the diffuse northern light bathed the pines outside in a wintry haze. I asked what the most frustrating time was in the course of the development of *Riven*.

"There are always frustrations. There was a lot of detail work that I just didn't see the necessity of. I'm not an artist; I've said that a thousand times. If we'd run out of money, we might have gotten divorced as brothers. It was tense. But we were lucky; we didn't run out of money. And there was this pseudo-commitment on

dates. It wasn't publicly announced or anything, but I asked Robyn when it was going to be done and he said, well, Christmas of 1996. So I went to Broderbund, I put my good name on the line, and then it didn't happen, and it was like ..." His voice trailed off; he was unwilling to complete the simile. "So I had to say, this time the date is going to be real, right? RIGHT?" His hands were out and encircling an imaginary neck. "Right?" He relaxed, recovered his unflappability.

So what about the future?

"I think we'll all take a break, and then I think we'll all do something together. I hope so, if you want to know my preference. But I'd be happy either way. Cyan could become a skeleton kind of thing, and I could do that. But Robyn is a world-builder; that's what he does. I'll wait and see what world Robyn wants to build."

You help Robyn build worlds?

"Sure. But let's suppose worst-case scenario. Let's say this thing sells 50,000 copies total and we all have to get real

jobs, what then? When times are tough, it is easier to love the Lord my God with all my heart, and that is the most important thing. I've said that before. And I know. I will know no matter what that *Riven* is the very best that we can do." He leaned back and laced his hands behind his head. "Is that cool, or what?"

Robyn was next. His office was in the basement, mostly underground, dim and cavernous. The space in front of the visitor's chair was littered with half-formed clay animals. Behind him, running along a shelf, was a large collection of plastic *Star Wars* toys.

I asked him about frustrations, and he knitted his brow, almost like a comic strip character demonstrating concentration.

"Well, this last push to get the walk-through ready for Broderbund; that was terribly frustrating. It just seemed like we were never going to get everything right. Everyone worked late, and we kept going over the same stuff. I know there were other frustrating parts, but that's what

I remember. Now it feels like the end is in sight. We may actually do this."

And there were times when you thought you wouldn't?

He grinned. "All the time. *All the time*. Two years into this project, we had absolutely nothing to show for it. I'm sure that bothered Broderbund quite a bit. I read somewhere that *Star Wars* was the same; that halfway through they had nothing they could really show anybody. I love *Riven*, though. It's the best thing I've ever created in my life. I think it's good, in all the senses of that word. But there is still a problem as long as the main character, the protagonist, is the player of the game. In the middle of the climax – our great message to the world – our main character might walk out of the room!"

And what about the future? Will there be a *Myst III*?

"Not with me involved in it, that's for sure. No sir. Not that universe again. We've done that."

Rand said that you like to build worlds, maybe that you need to build worlds.

"I'm not sure that's true. What I do know is that I don't just want to entertain people. I know it's possible that art can change people's lives. That's what I want to do."

Richard was last. His office was the mirror image of Robyn's, but much starker. His visitor's chair was ancient, wooden and uncomfortable; he bought it during his texture-hunting trip to Santa Fe. It does not encourage anyone to stay long.

I asked him about frustrations.

"Well, first you have to realize that this was the best working experience I ever had. That doesn't mean I want to stay in Spokane, because I don't. I think all the imports had a hard time adjusting here. But this was still a great place to work."

"When I was at ILM, before I went down to Disney, I worked on *Innerspace*. I really worked hard on it, and it was a piece of junk. I worked really hard on *Willow*, too, and then somehow when they started shooting the picture in London, hardly anything of what I did was used. It was hard for me to work on little pieces of film; I never knew what would end up in the movie. So if you want frustration, that's frustration. There is a level of ... seriousness and sincerity that I found here that I haven't found anywhere

else. Maybe being in Spokane was part of that, much as I hate to say it. Maybe this will turn out to be the best three years of my working life."

He stopped and stared at his desktop. His finger rubbed that place behind his left ear. The silence went on longer than silences usually do. Perhaps he was thinking about what we had just said and what that meant for his life; perhaps he was thinking about a wholly different problem.

The answer turned out to be (b), different problem.

"The frustration came halfway through. I realized that, in this method of storytelling, it is just very hard to evoke an emotional response. This is a very peculiar form, very nonlinear, obviously nonlinear, and it just does not lend itself to real narrative. It can't make you cry. I don't care if it's *Bambi*, a movie can make you cry, and then it can provide resurrection and exalt you. That's something we can't do."

Can't do, or can't do yet?

Another silence. "I don't know. Ask me tomorrow."

Silence. "These are long days."

What about the future?

"I have no idea. I might move to Northern California, to the wine country maybe. Or back to Los Angeles. I'll move, anyway. But beyond that, I have no idea."

It was almost dark. I put my notebook in my bag, walked up the back stairs, past the receptionist's desk with its bowl of hard candy (same bowl, I think), out through the trompe l'oeil portal, out to the car. Ten minutes later I was at Comfort World, the old Cyan offices where, a year before, I had encountered the twisty darkness in which some of *Riven* had been created, and had seen evidence of what may have been a rift, in which two brothers quarreled while making a game whose name means "split." I was not sure why I was there, peering into the front window in the fading light.

The glass was hard and cool against my forehead. I felt the wind curl around my neck. I listened to the buzz and roar of traffic. I felt as though I'd watched someone else's dream, some long night of revelry featuring Jesus and fire marbles and polygons and burgers of the universe, and it was over now. But look, they seem to have left a message ... ■ ■ ■

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Silicon Valley

◀ 138 estimate. The accord was reached under heavy pressure from the US government, which believes that liberalization will benefit lean-and-mean American firms because they know how to operate in a competitive environment.

US officials hammered away at their counterparts from Europe, Japan, and the Third World, warning them that if they didn't agree to orderly deregulation, American telephone companies would begin their own disorderly deregulation like piranhas going for the kill. "The callback phenomenon is tremendously important in terms of where we got," a US trade official told me. "It's proof that technological improvements will defeat regulatory structure. It provided us with leverage."

Nobody knows what's going to happen next, except that tectonic shifts will occur as phone companies try to best each other with improved services. The cost of interna-

tion calls is likely to drop like a rock in a dry well – Barshefsky predicts an 80 percent slide, from an average of \$1 per minute to 20 cents within a few years. Rates would plummet even more dramatically if the telcos put the Net to commercial use, which seems inevitable though not imminent (the bandwidth isn't there yet). If you doubt these predictions, just look at Sprint, which in April slashed weekend rates on calls to Great Britain to 10 cents a minute.

Services are likely to get not only cheaper, but better, as telcos offer integrated packages of voice, voicemail, conferencing, paging, cellular phones, fax, email, and Internet access. The idea is that you could access a sophisticated range of personalized phone services from anywhere in the world at the touch of a few buttons. For example, pick up a phone in Budapest or Buenos Aires, and you'll be able to dial a local or toll free number and pick up your voicemail, get voice translations of email, faxes, or pager messages, and be able to respond

tion got under way here – take advantage of a newly competitive environment to outthrust the 800-pound gorillas and do what they're doing, only better and cheaper. The global telecom market is up for grabs, and Telegroup wants a piece of it.

The big players realize that they need to expand beyond national borders to prosper. Alliances and takeovers are being made at breakneck speed – the British Telecom/MCI merger is just the largest example. It's no longer enough for Deutsche Telekom to have a stranglehold over the German market. In order to fulfill the needs of its corporate clients – the meat and potatoes of any major telecom's revenue – it must provide worldwide services, so that a German company's subsidiary in Japan or Australia has the same quality of service as the home office. The upshot is that the PTTs, some of which have been loosely allied with each other for years, are expected to broaden and deepen those alliances in the next few years while set-

ting up their own switching facilities in foreign lands. Some will prosper; some certainly will wither.

Enter the small guys, the Telegroups and the Global Links. Telegroup has issued about \$40 million in stock, and Global Link executives are traipsing across the globe touting their plans for an Internet-based phone system – a Holy Grail in the telecommunications world that many industry officials think is beyond Global Link's reach. Telegroup and Global Link contend that they have the nimbleness to become "virtual" phone carriers offering a full range of global services without owning all the clunky hardware typically associated with industry behemoths – everything from ditchdiggers to transcontinental cables and geosynchronous satellites.

"There's a lot of room for mixed players in the future," says Eli Noam, a professor of economics at Columbia University and head of the Columbia Institute for Tele-

Information. Noam defines mixed players as system integrators: "I've been arguing for years that they will become the telecom companies of the future. They will be doing a lot of bundling together of other people's elements rather than providing their own. But of course everyone's jumping on that, and whether it's the small companies that will be able to play the global role is questionable to me."

It's not questionable to the small companies. Global Link executives say that their know-how is more important than their infrastructure and that the firm could be valued at \$3 billion to \$6 billion in the proposed share offering. Gratzon, Telegroup's chairman, believes that the now-dominant PTTs are as dim-witted as IBM was in the early 1980s, when Apple emerged from nowhere with a better idea and the ability to move quickly.

"We have salespeople in more countries than just about any phone company in the world," Gratzon says. "We have customers in more countries than just about any phone company in the world. It's a good springboard." But what about the, um, other guys? "The competition out there is inept when it comes to marketing, even locally, because they're monopolies," he says. "Their customer-service track record is abysmal. They clearly ▶

US officials warned that without global telecom deregulation, American firms would move in like piranhas going for the kill.



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◀ 182 have zero competence in marketing over the border. Does France Telecom have any experience in Japan? I would say close to zero. Does Deutsche Telekom know the first thing about Brazil? No. All the phone companies in the world, with the exception of some Yanks, are very geocentric. Their networks are highly localized, they have no marketing infrastructure, they have no cultural experience, they have nothing. So the opportunity is huge."

A word of caution is in order here, and the word is Viatel. This small phone company began with callback services and migrated to conventional international service, primarily in Europe. It went public late last year, promising to dance around the big guys and set up a global phone network similar in scope and strategy to the systems Telegroup, Global Link, and others in their class are planning. One of Viatel's early shareholders was investor George Soros, a man known for having a golden touch. But Viatel has failed to live up to its projections, posting a \$29 million loss in 1996 on revenue of \$51 million. Its share price, \$12 when it went public in October, has tumbled by nearly half.

The truth is that although Telegroup would not mind growing into a global MCI, it doesn't need to become that big to become big. Confused? Look at the numbers again. The global phone market is worth more than half a *trillion* dollars now and could be worth a few trillion dollars in 10 or 20 years. "Not a month or a week goes by that I don't have an experience that stretches my perception as to realizing just how big the telecom market is," says Ronald Stakland, Telegroup's vice president for international marketing and operations (and a former oil broker). "The market is so big, it may as well be infinite in terms of market potential. In that sense, any company is going to have the opportunity to be very, very big."

The interesting catch is that in order to be very, very big, a company will need to control only a small piece of the market. In a filing with the SEC, Telegroup reports that it is the second largest carrier of international calls in France, The Netherlands, and Switzerland, though it has no more than a small share of each market. Big

deal, you say? Well, the French, Dutch, and Swiss together spend more than \$35 billion on both domestic and international phone calls annually, so if Telegroup gains just a decent slice of those markets as they liberalize in the next few years – let's say 3 percent – it will have locked up more than \$1 billion in revenue.

Not bad for a couple of guys who started their firm in a spare bedroom in Fairfield, Iowa. But why Fairfield? What's special about these guys, or about Fairfield? The answer may surprise you. Remember those Buddhist spires atop the Telegroup headquarters? (The Global Link headquarters has a similar set.) And remember the picture of the Indian guru propped against the wall in Gratson's office? And the fact that Gratson wears slippers in his office?

It's simple: Fairfield is ground zero of the transcendental meditation movement in the US. More than one-third of the town's residents are devout meditators, including the senior executives at Tele-

Over at Global Link, where visitors to the corporate headquarters building are expected to remove their shoes before walking on the pristine carpets, the attitude is the same. Global Link founder Christopher Hartnett describes TM as a "mental technology" that has given his company a competitive edge. "I don't think we could have had our growth without it," he says. "It has provided me with a tremendous amount of clarity of mind."

It's a simple thing, TM. For 20 minutes in the morning, preferably before breakfast, and for 20 minutes in the evening, preferably before dinner, you sit in a quiet place, close your eyes and silently repeat a sound, your mantra. You repeat it over and over again, and if you do it right, your mind wanders into a zone that is neither sleep nor wakefulness – it is between the two and beyond the two. When the session is over you open your eyes, and, if things have gone right and TM does what it is supposed to do, you

"The global telecom market is so large, it may as well be infinite. Any company has the opportunity to be very, very big."

group and Global Link and most of their employees. The Indian gentleman whose picture is in Gratson's office is Maharishi Mahesh Yogi, leader of the TM movement. Gratson, a longtime TM instructor, ran for the US Senate last year as a candidate from the Natural Law Party, a spinoff of the TM movement. In fact, Telegroup got its commercial liftoff from TM. Guess who constituted the bulk of Telegroup's international sales force at the outset? Meditators who Gratson and Rees had gotten to know through their years in the TM movement.

"All my success is due to the practice of transcendental meditation," Gratson says. "I see TM as an enormous competitive edge. People here are enormously focused. It's breathtaking how dedicated and focused everyone is, and at the same time there is a lightness in the air, an easiness. As far as I'm concerned, corporate America is missing out by not considering a TM program for their management."

feel relaxed, refreshed, clearer, as though you have gone for a swim in a mountain lake. For Telegroup's Type A personalities, it means that they can be Type As without the usual hang-ups of Type As – the ulcers, the outbursts, and all the rest. TM calms them down and allows them to work harder; Rees, for example, often slips back into his office at ten at night – after his evening meditation session – and stays until two or three in the morning, working on problems or sending email. And he's up the next morning, ready for more work, ready to conquer the world.

TM can be more than just a matter of meditation: it can include a holistic régime of eating and health care known as *Ayurveda* and even a form of architecture known as *Sthapatya veda*, which is said to generate success. Telegroup and Global Link embrace both principles: the spires atop their headquarters, their east-facing entrances, and each building's *bramistan* – its quiet reception area – are

Silicorn Valley

derived from *Sthapatya veda*. Telegroup goes a step further and offers its employees a health-care package that includes free *Ayurveda* treatments at The Raj, a local health spa and hotel that offers, among other amenities, herbal massages and "elimination therapy" (known to the rest of us as enemas).

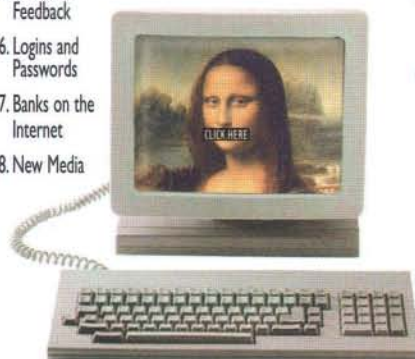
So why Iowa? The followers of the Maharishi ("great seer" in Sanskrit) founded the Maharishi International University in Santa Barbara, California, in 1971. The institution's students soon overcrowded the small apartment complex the university was renting. When a small college in Fairfield went bankrupt and offered its campus for a song (\$2.5 million) in 1974, the Maharishi's followers decamped to the heartland. The campus, a smattering of classroom buildings and podlike living quarters, suited them well, though they had to build the meditation domes, one for men, one for women. More than two decades later, the meditators have deep roots here. The town features a couple of vegetarian restaurants, a few New Age bookstores, and a natural-vitamin store, and there's a Maharishi High School, too, for the next generation of meditators.

It all lends Fairfield the tie-dyed feel of Berkeley, though of course Fairfield is not Berkeley and Iowa is not California (for which the residents of both states are no doubt equally grateful). No hills surround Fairfield, no bays or bridges or tall buildings, just one movie theater - and if you wander around asking where you can get a double-decaf skim latte, well, you'll find out what Iowa laughter sounds like.

In other words, after a few days it was time to leave Fairfield. I got back in my car, drove back up the dirt road, passed a barn with "Pride-o-Prairie" painted on its side, pulled onto Route 1, waved at the farmers on their tractors, and kept on cruising until I reached the Cedar Rapids Municipal Airport. I arrived home soon enough, turnstiling through O'Hare, but from time to time my mind floats back to where I was on that journey, and what I saw - things I would not have expected to see - and a gee-whiz question rustles around my head like a cornstalk in a breeze. It's a whisper of a question, just one word long, and it is this: *Iowa?* ■ ■ ■

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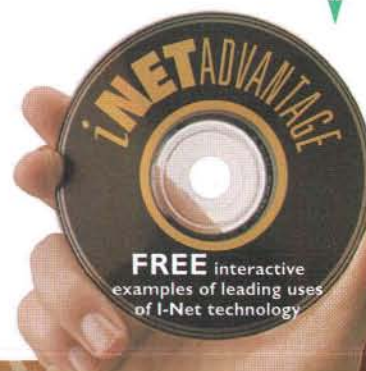
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New Rules

◀ 144 significance precedes momentum.

Biologists tell a parable of the lily leaf, which doubles in size every day. The day before it completely covers the pond, the water is only half covered, and the day before that, only a quarter covered, and the day before that, only a measly eighth. So, while the lily grows imperceptibly all summer long, only in the last week of the cycle would most bystanders notice its "sudden" appearance. But by then, it is far past the tipping point.

The Network Economy is a lily pond. The Web, as one example, is a leaf doubling in size every six months. MUDs and MOOs, Teledesic phones, wireless data ports, collaborative bots, and remote solid state sensors are also leaves in the network lily pond. Right now, they are just itty-bitsy lily cells merrily festering at the beginning of a hot network summer.

In the Network Economy, significance precedes momentum.

5 The Law of Increasing Returns Make virtuous circles

The prime law of networking is known as the law of increasing returns. Value explodes with membership, and the value explosion sucks in more members, compounding the result. An old saying puts it more succinctly: Them that's got shall get.

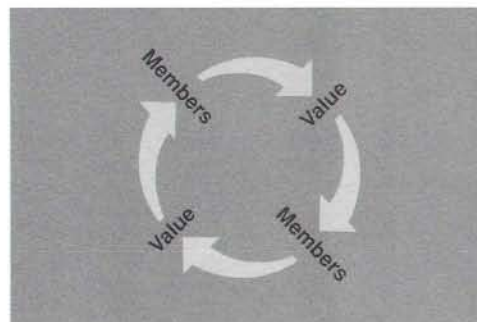
We see this effect in the way areas such as Silicon Valley grow; each new successful start-up attracts other start-ups, which in turn attract more capital and skills and yet more start-ups. (Silicon Valley and other high tech industrial regions are themselves tightly coupled networks of talent, resources, and opportunities.)

The law of increasing returns is far more than the textbook notion of economies of scale. In the old rules, Henry Ford leveraged his success in selling cars to devise more efficient methods of production. This enabled Ford to sell his cars more cheaply, which created larger sales, which fueled more innovation and even better production methods, sending his company to the top. While the law of increasing returns and the economies of scale both rely on positive feedback loops, the former is propelled by the amazing potency of net power, and the latter isn't. First, industrial economies of scale increase value linearly, while the prime law increases value exponentially - the difference

between a piggy bank and compounded interest.

Second, and more important, industrial economies of scale stem from the herculean efforts of a single organization to outpace the competition by creating value for less. The expertise (and advantage) developed by the leading company is its alone. By contrast, networked increasing returns are created and shared by the entire network. Many agents, users, and competitors together create the network's value. Although the gains of increasing returns may be reaped unequally by one organization over another, the value of the gains resides in the greater web of relationships.

Huge amounts of cash may pour toward network winners such as Cisco or Oracle or Microsoft, but the supersaturated matrix of increasing returns woven through their companies would continue to expand into the net even if those particular companies should disappear.



Likewise, the increasing returns we see in Silicon Valley are not dependent on any particular company's success. As AnnaLee Saxenian, author of *Regional Advantage*, notes, Silicon Valley has in effect become one large, distributed company. "People joke that you can change jobs without changing car pools," Saxenian told *Washington Post* reporter Elizabeth Corcoran. "Some say they wake up thinking they work for Silicon Valley. Their loyalty is more to advancing technology or to the region than it is to any individual firm."

One can take this trend further. We are headed into an era when both workers and consumers will feel more loyalty to a network than to any ordinary firm. The great innovation of Silicon Valley is not the wowie-zowie hardware and software it has invented, but the social organization of its companies and, most important, the networked architecture of the region itself - the tangled web of former jobs, intimate colleagues, information leakage from one firm to the

next, rapid company life cycles, and agile email culture. This social web, suffused into the warm hardware of jelly bean chips and copper neurons, creates a true Network Economy.

The nature of the law of increasing returns favors the early. The initial parameters and conventions that give a network its very power quickly freeze into unalterable standards. The solidifying standards of a network are both its blessing and its curse - a blessing because from the de facto collective agreement flows the unleashed power of increasing returns, and a curse because those who own or control the standard are disproportionately rewarded.

But the Network Economy doesn't allow one without the other. Microsoft's billions are tolerated because so many others in the Network Economy have made their collective billions on the advantages of Microsoft's increasing-returns standards.

In a Network Economy, life is tricky

In networks, we find self-reinforcing virtuous circles. Each additional member increases the network's value, which in turn attracts more members, which in turn increases value, and so on, in a spiral of benefits.

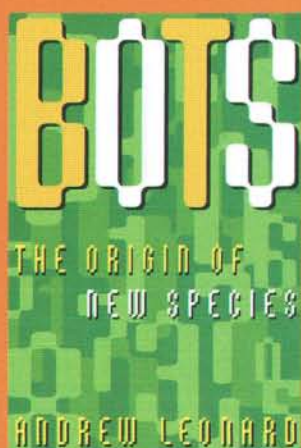
for consumers, who must decide which early protocol to support. Withdrawing later from the wrong network of relationships is painful - but not as painful as companies who bet their whole lives on the wrong one. Nonetheless, guessing wrong about conventions is still better than ignoring network dynamics altogether. There is no future for hermetically sealed closed systems in the Network Economy. The more dimensions accessible to member input and creation, the more increasing returns can animate the network, the more the system will feed on itself and prosper. The less it allows these, the more it will be bypassed.

The Network Economy rewards schemes that allow decentralized creation and punishes those that don't. An automobile maker in the industrial age maintains control over all aspects of the car's parts and construction. An automobile maker in the Network Economy will establish a web of standards and outsourced suppliers, encouraging the web itself to invent the car, seeding the system with

188 ▶

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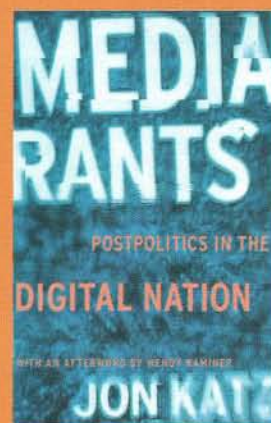
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Charles McGrath, The New York Times
Book Review

New Rules

◀ 186 knowledge it gives away, engaging as many participants as broadly as possible, in order to create a virtuous loop where every member's success is shared and leveraged by all.

In the Network Economy, make virtuous circles.

6 The Law of Inverse Pricing Anticipate the cheap

One curious aspect of the Network Economy would astound a citizen living in 1897: The very best gets cheaper each year. This rule of thumb is so ingrained in our contemporary lifestyle that we bank on it without marveling at it. But marvel we should, because this paradox is a major engine of the new economy.

Through most of the industrial age, consumers experienced slight improvements in quality for slight increases in

Gilder's Law says that the cost per communicated bit will begin to sink faster than it has fallen previously. Eventually, the cost of a telephone call will be "free."

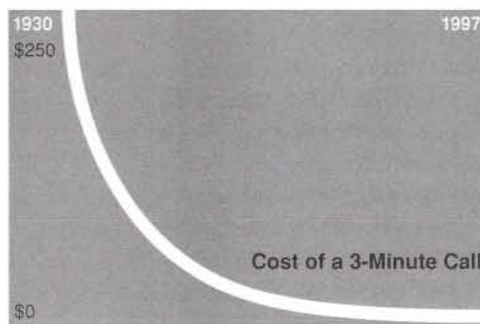
price. But the arrival of the microprocessor flipped the price equation. In the information age, consumers quickly came to count on drastically superior quality for less price over time. The price and quality curves diverge so dramatically that it sometimes seems as if the better something is, the cheaper it will cost.

Computer chips launched this inversion, as Ted Lewis, author of *The Friction Free Economy*, points out. Engineers used the supreme virtues of computers to directly and indirectly create the next improved version of computers. By compounding our learning in this fashion, we got more out of less material. So potent is compounding chip power that everything it touches – cars, clothes, food – falls under its spell. Indirectly amplified learning by shrinking chips enabled just-in-time production systems and the outsourcing of very high tech manufacturing to low-wage labor – both of which lowered the prices of goods still further.

Today, shrinking chip meets exploding net. Just as we leveraged compounded learning in creating the microprocessor, we are leveraging the same multiplying loops in creating the global communications web. We use the supreme virtues of networked communications to directly and indirectly create better versions of networked communications.

Almost from their birth in 1971, microprocessors have lived in the realm of inverted pricing. Now, telecommunications is about to experience the same kind of plunges that microprocessor chips take – halving in price, or doubling in power, every 18 months – but even more drastically. The chip's pricing flip was called Moore's Law. The net's flip is called Gilder's Law, for George Gilder, a radical technothorist who forecasts that for the foreseeable future (the next 25 years), the total bandwidth of communication systems will triple every 12 months.

The conjunction of escalating communication power with shrinking size of jelly



bean nodes at collapsing prices leads Gilder to speak of bandwidth becoming free. What he means is that the price per bit transmitted slides down an asymptotic curve toward the free. An asymptotic curve is like Zero's tortoise: with each step forward, the tortoise gets closer to the limit but never actually reaches it. An asymptotic price curve falls toward the free without ever touching it, but its trajectory closely paralleling the free is what becomes important.

In the Network Economy, bandwidth is not the only thing headed this way. Mips-per-dollar calculations head toward the free. Transaction costs dive toward the free. Information itself – headlines and stock quotes – plunges toward the free. Indeed, all items that can be copied, both tangible and intangible, adhere to the law of inverted pricing and become cheaper as they improve. While it is true that automobiles will never be free, the cost per mile will dip toward the free. It is the

function per dollar that continues to drop.

For consumers, this is heaven. For those hoping to make a buck, this will be a cruel world. Prices will eventually settle down near the free (gulp!), but quality is completely open-ended at the top. For instance, all-you-can-use telephone service someday will be essentially free, but its quality can only continue to ascend, just to keep competitive.

So how will the telcos – and others – make enough money for profit, R&D, and system maintenance? By expanding what we consider a telephone to be. Over time, any invented product is on a one-way trip over the cliff of inverted pricing and down the curve toward the free. As the Network Economy catches up to all manufactured items, they will all slide down this chute more rapidly than ever. Our job, then, is to create new things to send down the slide – in short, to invent items faster than they are commoditized.

This is easier to do in a network-based economy because the criss-crossing of ideas, the hyperlinking of relationships, the agility of alliances, and the nimble quickness of creating new nodes all support the constant generation of new goods and services where none were before.

And, by the way, the appetite for more things is insatiable. Each new invention placed in the economy creates the opportunity and desire for two more. While plain old telephone service is headed toward the free, I now have three phone lines just for my machines and will someday have a data "line" for every object in my house. More important, managing these lines, the data they transmit, the messages to me, the storage thereof, the need for mobility, all enlarge what I think of as a phone and what I will pay a premium for.

In the Network Economy, you can count on the best getting cheaper; as it does, it opens a space around it for something new that is dear. Anticipate the cheap.

7 The Law of Generosity Follow the free

If services become more valuable the more plentiful they are (Law #2), and if they cost less the better and the more valuable they become (Law #6), then the extension of this logic says that the most valuable things of all should be those that are given away.

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New Rules

◀ 188 program, is given away as freeware in order to sell upgraded versions. Some 1 million copies of McAfee's antivirus software are distributed free each month. And, of course, Sun passed Java out gratis, sending its stock up and launching a mini-industry of Java app developers.

Can you imagine a young executive in the 1940s telling the board that his latest idea is to give away the first 40 million copies of his only product? (It's what Netscape did 50 years later.) He would not have lasted a New York minute.

But now, giving away the store for free is an applauded, level-headed strategy that banks on the network's new rules. Because compounding network knowledge inverts prices, the marginal cost of an additional copy (intangible or tangible) is near zero. Because value appreciates in proportion to abundance, a flood of copies increases the value of all the

The cost of commodities, which can be replicated easily, tends toward zero, or free. While the cost may never reach free, it heads in that direction in a curve called an asymptote, eventually paralleling the absolute bottom limit of "free."

copies. Because the more value the copies accrue, the more desirable they become, the spread of the product becomes self-fulfilling. Once the product's worth and indispensability is established, the company sells auxiliary services or upgrades, enabling it to continue its generosity and maintaining this marvelous circle.

One could argue that this frightening dynamic works only with software, since the marginal cost of an additional copy is already near zero. That would misread the universality of the inverted price. Made-with-atoms hardware is also following this force when networked. Cellular phones are given away to sell their services. We can expect to see direct-TV dishes – or any object with which the advantages of being plugged in exceed the diminishing cost of replicating the object – given away for the same reasons.

The natural question is how companies are to survive in a world of generosity. Three points will help.

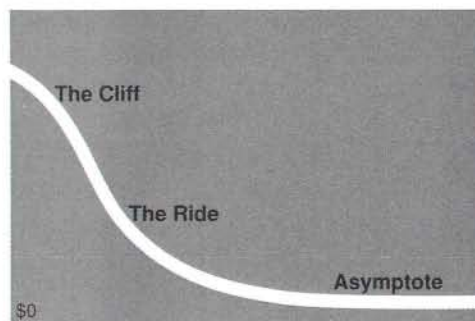
First, think of "free" as a design goal for pricing. There is a drive toward the free

– the asymptotic free – that, even if not reached, makes the system behave as if it does. A very small flat rate may have the same effects as flat-out free.

Second, while one product is free, this usually positions other services to be valuable. Thus, Sun gives Java away to help sell servers and Netscape hands out consumer browsers to help sell commercial server software.

Third, and most important, following the free is a way to rehearse a service's or a good's eventual fall to free. You structure your business *as if* the thing that you are creating is free in anticipation of where its price is going. Thus, while Sega game consoles are not free to consumers, they are sold at a loss leader to accelerate their eventual destiny as something that will be given away in a Network Economy.

Another way to view this effect is in terms of attention. The only factor becoming scarce in a world of abundance is human attention. Each human has an



absolute limit of only 24 hours per day to provide attention to the millions of innovations and opportunities thrown up by the economy. Giving stuff away garners human attention, or mind share, which then leads to market share.

Following the free also works in the other direction. If one way to increase product value is to make products free, then many things now without cost hide great value. We can anticipate wealth by following the free.

In the Web's early days, the first indexes to this uncharted territory were written by students and given away. The indexes helped humans focus their attention on a few sites out of thousands and helped draw attention to the sites, so webmasters aided the indexers' efforts. By being available free, indexes became ubiquitous. Their ubiquity quickly led to explosive stock values for the indexers and enabled other Web services to flourish.

So what is free now that may later lead to extreme value? Where today is generosity preceding wealth? A short list

of online candidates would be digesters, guides, cataloguers, FAQs, remote live cameras, Web splashes, and numerous bots. Free for now, each of these will someday have profitable companies built around them. These marginal functions now are not fringe; remember, for instance, that in the industrial age *Readers Digest* is the world's most widely read magazine, that *TV Guide* is more profitable than the three major networks it guides viewers to, and that the *Encyclopaedia Britannica* began as a compendium of articles by amateurs – not too dissimilar from FAQs.

But the migration from ad hoc use to commercialization cannot be rushed. One of the law of generosity's corollaries is that value in the Network Economy requires a protocommmercial stage. Again, wealth feeds off ubiquity, and ubiquity usually mandates some level of sharing. The early Internet and the early Web sported amazingly robust gift economies; goods and services were swapped, shared generously, or donated outright – actually, this was the sole way to acquire things online. Idealistic as this attitude was, it was the only sane way to launch a commercial economy in the emerging space. The flaw that science fiction ace William Gibson found in the Web – its capacity to waste tremendous amounts of time – was in fact, as Gibson further noted, its saving grace. In a Network Economy, innovations must first be seeded into the inefficiencies of the gift economy to later sprout in the commercial economy's efficiencies.

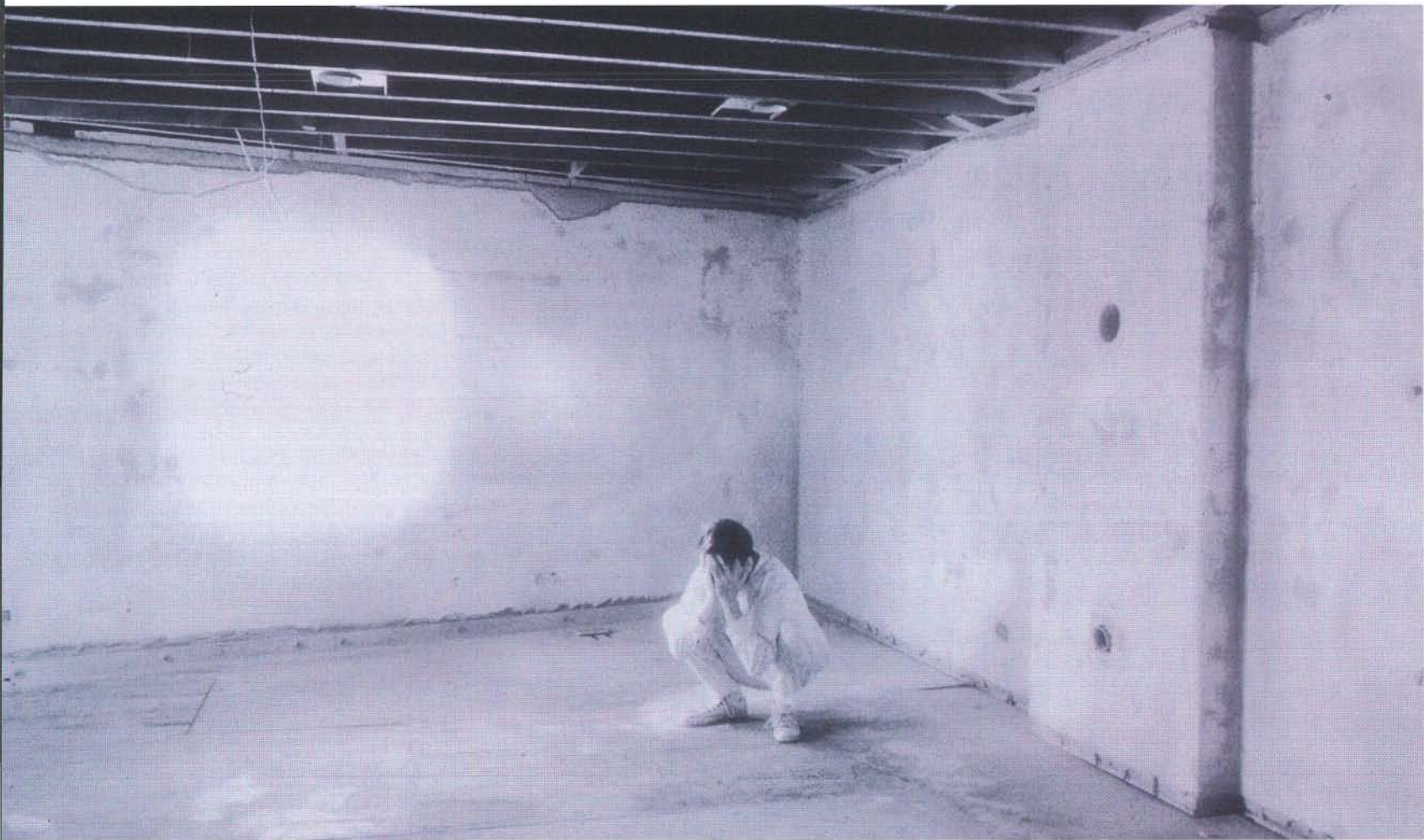
It's a rare (and foolish) software outfit these days that does not introduce its wares into the free economy as a beta version in some fashion. Fifty years ago, the notion of releasing a product unfinished – with the intention that the public would help complete it – would have been considered either cowardly, cheap, or inept. But in the new regime, this precommercial stage is brave, prudent, and vital.

In the Network Economy, follow the free.

8 The Law of the Allegiance Feed the web first

The distinguishing characteristic of networks is that they have no clear center and no clear outer boundaries. The vital distinction between the self (us) and the nonself (them) – once exemplified by the allegiance of the industrial-era organization man – becomes less meaningful in a Network Economy. The only "inside" 192 ▶

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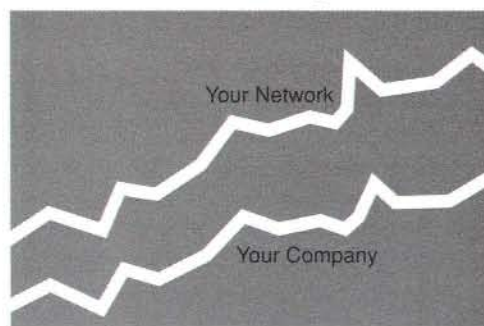
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New Rules

◀ 190 now is whether you are on the network or off. Individual allegiance moves



away from organizations and toward networks and network platforms. (Are you Windows or Mac?)

Thus, we see fierce enthusiasm from consumers for open architectures. Users are voting for maximizing the value of the network itself. Companies have to play this way, too. As consultant John Hagel argues, a company's primary focus in a networked world shifts from maximizing the firm's value to maximizing the value of the infrastructure whole. For instance, game companies will devote as much energy promoting the platform – the tangle of users, developers, hardware manufacturers, etc. – as they do to their product. Unless their web thrives, they die.

The net is a possibility factory, churning out novel opportunities by the diskful. But unless this explosion is harnessed, it will drown the unprepared. What the computer industry calls “standards” is an attempt to tame the debilitating abundance of competing possibilities. Standards strengthen a network; their constraints solidify a pathway, allowing innovation and evolution to accelerate. So central is the need to tame the choice of possibilities that organizations must make the common standard their first allegiance. Companies positioned at the gateway to a standard will reap the largest rewards. But as a company prospers, so do those in its web.

A network is like a country. In both, the surest route to raising one's own prosperity is raising the system's prosperity. The one clear effect of the industrial age is that the prosperity individuals achieve is more closely related to their nation's prosperity than to their own efforts.

The net is like a country, but with three important differences:

- 1) No geographical or temporal boundaries exist – relations flow 24 by 7 by 365.
- 2) Relations in the Network Economy

are more tightly coupled, more intense, more persistent, and more intimate in many ways than those in a country.

- 3) Multiple overlapping networks exist,

The prosperity of a company is directly linked to the prosperity of its network. As the platform or standard it operates on flourishes, so does the firm.

with multiple overlapping allegiances.

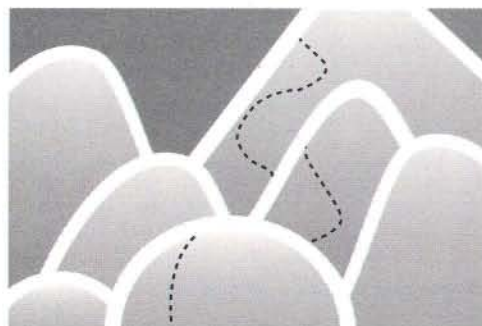
Yet, in every network, the rule is the same. For maximum prosperity, feed the web first.

9 The Law of Devolution Let go at the top

The tightly linked nature of any economy, but especially the Network Economy's ultraconnected constitution, makes it behave ecologically. The fate of individual organizations is not dependent entirely on their own merits, but also on the fate of their neighbors, their allies, their competitors, and, of course, on that of the immediate environment.

Some biomes in nature are shy of opportunities for life. In the Arctic there are only a couple of styles of living, and a species had better get good at one of them. Other biomes are chock full of opportunities, and those possibilities are in constant flux, appearing and retreating in biological time as species jockey toward maximum adaptability.

The rich, interactive, and highly plastic shape of the Network Economy resembles a biome seething with action. New niches pop up constantly and go away as fast. Competitors sprout beneath you and then gobble your spot up. One day you are king of the mountain, and the next day there is no mountain at all.



Biologists describe the struggle of an organism to adapt in this biome as a long climb uphill, where *uphill* means greater adaptation. In this visualization, an organism that is maximally adapted to the times is situated on a peak. It is easy to imagine a commercial organization substituted for the organism. A company expends great effort to move its butt uphill, or to evolve its product so that it is sitting on top, where it is maximally adapted to the consumer environment.

All organizations (profit and nonprofit alike) face two problems as they attempt to find their peak of optimal fit. Both are amplified by a Network Economy in which turbulence is the norm.

First, unlike the industrial arc's relatively simple environment, where it was fairly clear what an optimal product looked like and where on the slow-moving horizon a company should place itself, it is increasingly difficult in the Network Economy to discern what hills are highest and what summits are false.

Big and small companies alike can relate to this problem. It's unclear whether one should strive to be the world's best hard disc manufacturer when the mountain beneath that particular peak may not be there in a few years. An organization can cheer itself silly on its way to becoming the world's expert on a dead-end technology. In biology's phrasing, it gets stuck on a local peak.

The harsh news is that getting stuck is a *certainty* in the new economy. Sooner, rather than later, a product will be eclipsed at its prime. While one product is at its peak, another will move the mountain by changing the rules.

There is only one way out. The organism must devolve. In order to go from one high peak to another, it must go downhill first and cross a valley before climbing uphill again. It must reverse itself and become less adapted, less fit, less optimal.

This brings us to the second problem. Organizations, like living beings, are hard-wired to optimize what they know 194 ▶

Turbulent times mean that local success is not global success. A company may be at peak efficiency, but on the wrong mountain. Nearby looms a higher peak. To scale a higher peak means crossing a valley of less fitness first.

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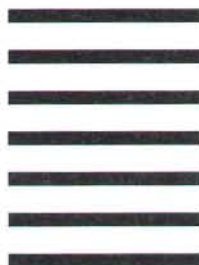
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AAAF is a non-profit organization formed to promote Asian Pacific Arts and increase cross-cultural dialogue through the medium of art. AAAF provides both public recognition for established artists and financial grants for emerging artists and Asian Pacific Arts organizations.

New Rules

◀ 192 and to not throw success away. Companies find devolving a) unthinkable and b) impossible. There is simply no room in the enterprise for the concept of letting go – let alone the skill to let go – of something that is working, and trudge downhill toward chaos.

And it will be chaotic and dangerous down below. The definition of lower adaptivity is that you are closer to extinction. Finding the next peak is suddenly the next life-or-death assignment.

But there is no alternative (that we know of) to leaving behind perfectly good products, expensively developed technology, and wonderful brands and heading down to trouble in order to ascend again in hope. In the future, this forced march will become routine.

The biological nature of this era means that the sudden disintegration of established domains will be as certain as the sudden appearance of the new. Therefore, there can be no expertise in innovation unless there is also expertise in demolishing the ensconced.

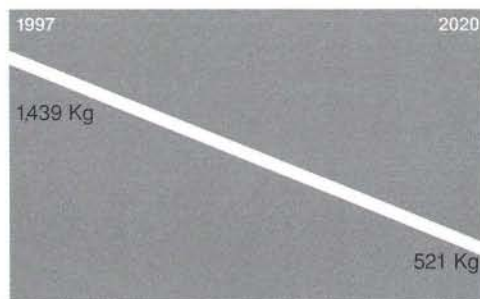
In the Network Economy, the ability to relinquish a product or occupation or industry at its peak will be priceless. Let go at the top.

10 The Law of Displacement The net wins

Many observers have noted the gradual displacement in our economy of materials by information. Automobiles weigh less than they once did and perform better. The missing materials have been substituted with nearly weightless high tech know-how in the form of plastics and composite fiber materials. This displacement of mass with bits will continue in the Network Economy.

Whereas once the unique dynamics of the software and computer industry (increasing returns, following the free, etc.) were seen as special cases within the larger “real” economy of steel, oil, automobiles, and farms, the dynamics of networks will continue to displace the old economic dynamics until network behavior becomes the entire economy.

For example, take the new logic of cars as outlined by energy visionary Amory Lovins. What could be more industrial-age than automobiles? However, chips and networks can displace



SOURCE: ROCKY MOUNTAIN INSTITUTE

the industrial age in cars, too. Most of the energy a car consumes is used to move the car itself, not the passenger. So, if the car's body and engine can be diminished in size, less power is needed to move the car, meaning the engine can be made yet smaller, which means that the car can be smaller yet, and so on down the similar slide of compounded value that microprocessors followed. That's because smart materials – stuff that requires increasing knowledge to invent and make – are shrinking the steel.

Detroit and Japan have designed concept cars built out of ultralightweight composite fiber material weighing about 1,000 pounds, powered by hybrid-electric motors. They take away the mass of radiator, axle, and drive shaft by substituting networked chips. Just as embedding chips in brakes made them safer, these lightweight cars will be wired with network intelligence to make them safer: a crash will inflate the intelligence of multiple air bags – think smart bubblepak.

The accumulated effect of this substitution of knowledge for material in automobiles is a hypercar that will be safer than today's car, yet can cross the continental US on one tank of fuel.

Already, the typical car boasts more computing power than your typical desktop PC, but what the hypercar promises, says Lovins, is not wheels with lots of chips, but a *chip with wheels*. A car can rightly be viewed as headed toward becoming a solid state module. And it will drive on a road system increasingly wired as a decentralized electronic network obeying the Network Economy's laws.

Once we see cars as chips with wheels, it's easier to imagine airplanes as chips with wings, farms as chips with soil, houses as chips with inhabitants. Yes, they will have mass, but that mass will be subjugated by the overwhelming amount of knowledge and information flowing through it, and, in economic terms, these objects will behave as if they had no mass at all. In that way,

The rules of the network operate even in such industrial icons as the auto industry. An automobile's average weight globally has dropped over time and will continue to drop as information replaces its mass.

they migrate to the Network Economy.

Nicholas “Atoms-to-Bits” Negroponte guesstimates that the Network Economy will reach \$1 trillion by 2000. What this figure doesn't represent is the scale of the economic world that is moving onto the Internet – that grand net of interconnected objects – as the Network Economy infiltrates cars and traffic and steel and corn. Even if all cars aren't sold online right away, the way cars are designed, manufactured, built, and operated will depend on network logic and chip power.

The question “How big will online commerce be?” will have diminishing relevance, because all commerce is jumping onto the Internet. The distinctions between the Network Economy and the industrial economy will fade to the difference of animated versus inert. If money and information flow through something, then it's part of the Network Economy.

In the Network Economy, the net wins. All transactions and objects will tend to obey network logic.

11 The Law of Churn Seek sustainable disequilibrium

In the industrial perspective, the economy was a machine that was to be tweaked to optimal efficiency, and, once finely tuned, maintained in productive harmony. Companies or industries especially productive of jobs or goods had to be protected and cherished at all costs, as if these firms were rare watches in a glass case.

As networks have permeated our world, the economy has come to resemble an ecology of organisms, interlinked and coevolving, constantly in flux, deeply tangled, ever expanding at its edges. As we know from recent ecological studies, no balance exists in nature; rather, as evolution proceeds, there is perpetual disruption as new species displace old, as natural biomes shift in their makeup, and as organisms and environments transform each other. So it is with

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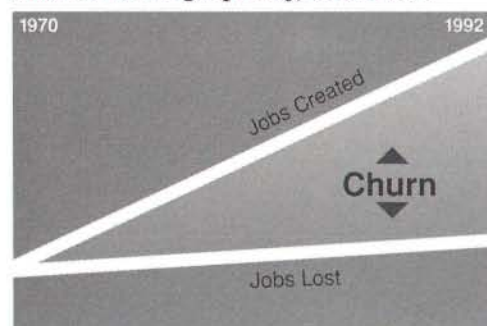
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New Rules

◀ 194 the network perspective: companies come and go quickly, careers are



patchworks of vocations, industries are indefinite groupings of fluctuating firms.

Change is no stranger to the industrial economy or the embryonic information economy; Alvin Toffler coined the term *future shock* in 1970 as the sane response of humans to accelerating change. But the Network Economy has moved from change to churn.

Change, even in its toxic form, is rapid difference. Churn, on the other hand, is more like the Hindu god Shiva, a creative force of destruction and genesis. Churn topples the incumbent and creates a platform ideal for more innovation and birth. It is "compounded rebirth." And this genesis hovers on the edge of chaos.

Donald Hicks of the University of Texas studied the half-life of Texan businesses for the past 22 years and found that their longevity has dropped by half since 1970. That's change. But Austin, the city in Texas that has the shortest expected life spans for new businesses, also has the fastest-growing number of jobs and the highest wages. That's churn.

Hicks told his sponsors in Texas that "the vast majority of the employers and employment on which Texans will depend in the year 2026 - or even 2006 - do not yet exist." In order to produce 3 million new jobs by 2020, 15 million new jobs must be created in all, because of churn. "Rather than considering jobs as a fixed sum to be protected and augmented, Hicks argued, the state should focus on encouraging economic churning - on continually re-creating the state's economy," writes Jerry Useem in *Inc.*, a small-business magazine that featured Hicks's report. Ironically, only by promoting churn can long-term stability be achieved.

This notion of constant churn is familiar to ecologists and those who manage large networks. The sustained vitality of a complex network requires that the net

keep provoking itself out of balance. If the system settles into harmony and equilibrium, it will eventually stagnate and die.

Innovation is a disruption; constant

The number of old jobs lost increases, but not as fast as the number of new jobs created. More important, the spread of gained jobs over lost jobs widens. Think of it as a positive churn of employment.

innovation is perpetual disruption. This seems to be the goal of a well-made network: to sustain a perpetual disequilibrium. As economists (such as Paul Romer and Brian Arthur) begin to study the Network Economy, they see that it, too, operates by poisoning itself on the edge of constant chaos. In this chaotic churn is life-giving renewal and growth.

The difference between chaos and the edge of chaos is subtle. Apple Computer, in its attempt to seek persistent disequilibrium and stay innovative, may have leaned too far off-balance and unraveled toward extinction. Or, if its luck holds, after a near-death experience in devolution it may be burrowing toward a new mountain to climb.

The dark side of churn in the Network Economy is that the new economy builds on the constant extinction of individual companies as they're outpaced or morphed into yet newer companies in new fields. Industries and occupations also experience this churn. Even a sequence of rapid job changes for workers - let alone lifetime employment - is on its way out. Instead, careers - if that is the word for them - will increasingly resemble networks of multiple and simultaneous commitments with a constant churn of new skills and outmoded roles.

Networks are turbulent and uncertain. The prospect of constantly tearing down what is now working will make future

shock seem tame. We, of course, will challenge the need to undo established successes, but we'll also find exhausting the constant, fierce birthing of so much that is new. The Network Economy is so primed to generate self-making newness that we may find this ceaseless tide of birth a type of violence.

Nonetheless, in the coming churn, the industrial age's titans will fall. In a poetic sense, the prime task of the Network Economy is to destroy - company by company, industry by industry - the industrial economy. While it undoes industry at its peak, it weaves a larger web of new, more agile, more tightly linked organizations between its spaces.

Effective churning will be an art. In any case, promoting stability, defending productivity, and protecting success can only prolong the misery. When in doubt, churn. In the Network Economy, seek sustainable disequilibrium.

12 The Law of Inefficiencies Don't solve problems

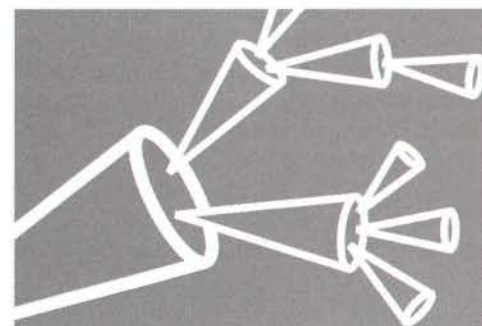
In the end, what does this Network Economy bring us?

Economists once thought that the coming age would bring supreme productivity. But, in a paradox, increasing technology has not led to measurable increases in productivity.

This is because productivity is exactly the wrong thing to care about. The only ones who should worry about productivity are robots. And, in fact, the one area of the economy that does show a rise in productivity has been the US and Japanese manufacturing sectors, which have seen about a 3 to 5 percent annual increase throughout the 1980s and into the 1990s. This is exactly where you want to find productivity. But we don't see productivity gains in the misnamed catch-all category, the service industry - and why would we? Is a Hollywood movie company that produces longer movies per dollar more

197 ▶

Each new invention creates a space from which several more inventions can be created. And from each of those new innovations comes yet more spaces of opportunity. There is more to be gained by creating new spaces than by maximizing the efficiencies of the old spaces.



New Rules

◀ 196 productive than one that produces shorter movies?

The problem with trying to measure productivity is that it measures only how well people can do the wrong jobs. Any job that can be measured for productivity probably should be eliminated.

Peter Drucker has noted that in the industrial age, the task for each worker was to discover how to do his job better; that's productivity. But in the Network Economy, where machines do most of the inhumane work of manufacturing, the task for each worker is not "how to do this job right" but "what is the right job to do?" In the coming era, doing the exactly right next thing is far more "productive" than doing the same thing better. But how can one easily measure this vital sense of exploration and discovery? It will be invisible to productivity benchmarks.

Wasting time and being inefficient are the way to discovery. The Web is being run by 20-year-olds because they can afford to waste the 50 hours it takes to become proficient in exploring the Web. While 40-year-old boomers can't take a vacation without thinking how they'll justify the trip as being productive in some sense, the young can follow hunches and create seemingly mindless novelties on the Web without worrying about whether they are being efficient. Out of these inefficient tinkering will come the future.

In the Network Economy, productivity is not our bottleneck. Our ability to solve our social and economic problems will be limited primarily by our lack of imagination in seizing opportunities, rather than trying to optimize solutions. In the words of Peter Drucker, as echoed recently by George Gilder, "Don't solve problems, seek opportunities." When you are solving problems, you are investing in your weaknesses; when you are seeking opportunities, you are banking on the network. The wonderful news about the Network Economy is that it plays right into human strengths. Repetition, sequels, copies, and automation all tend toward the free, while the innovative, original, and imaginative all soar in value.

Our minds will at first be bound by old rules of economic growth and productivity. Listening to the network can unloose them. In the Network Economy, don't solve problems, seek opportunities. ■ ■ ■

Chip Hop

◀ 153 One guy got drummed out of the hip hop chat room because he had prewritten his rhymes. When they started to call him a pre-be, I just cracked up."

But Steve was learning more than to steer clear of canned lyrics. By 1996, Steve had mastered HTML, Perl, and JavaScript. The marriage of rapper and webmaster had him hooked on online hip hop. Indeed, he now believes that the World Wide Web has pushed the music into an era of massive change: It's given rise to international influences and multilingual rhyming. It's merging technological jargon with the vocabulary of the street. And it's allowing people from all over the planet to instantaneously collaborate on a single musical work.

"American artists have sampled everything from jazz to classical music, but kids from other countries aren't confined to a 4/4 measure," says Steve. "And they aren't confined to rhyming about life in America. We're beginning to hear some real bizarre shit."

To date, hip hop online has been wack, boring, and mediocre.

THE MARKETER

Steve's partner in rhyme, Felicia Palmer, knows about experimentation, and she displays no visible fear of its risks. Her compact stature can't contain her enthusiasm. Her eyes never seem to blink. And her mouth, well, her mouth works fine – all the time. She sold Steve on the idea of being an independent Web publisher. She talked the other members into joining Support Online Hip Hop. And she convinced Essence Online to hire her as their webmaster before they even knew what the Internet was. Felicia Palmer is a born marketer, a salesperson with a penchant for long odds.

Felicia also grew up listening to hip hop's precursors play the concrete playgrounds in the South Bronx – her brother was a DJ in a local hip hop crew. And though she left the neighborhood to study at Cornell University, Felicia never strayed far from home. And she always returned to the hip hop scene. One night in 1992, while checking out a music industry event at The Grand in Manhattan, she met Steven Samuel. "I was standing

beside the stage when the Troubleneck Brothers stepped up," she says. "I met eyes with little Stevie, who stood out from among the seven brothers because he looked about 16 years old. Of course, now he'll tell you that I was after his wisdom, but back then he thought I was a groupie trying to kick it to him."

That night was the beginning of a long relationship. On a whim, in 1995, Steve and Felicia launched an email-based hip hop trivia contest with a mix-tape giveaway on AOL. They received hundreds of replies, a response that opened Felicia's eyes to the burgeoning online hip hop community. For Felicia, the trivia contest turned out to be guerrilla marketing for her next big project.

In March 1996, Steve and Felicia launched *4Control*, a publication devoted to chronicling the surprise convergence of digital technology and hip hop. While digital recording and distribution promised to reinvent the music industry, many in *4Control's* target audience were still hacking analog

electronics. Nervous that hip hoppers might miss out on the digital revolution, the zine's first issue proclaimed: *For those of you wondering who we are – we are some kids from the Bronx who decided it's time to give hip hop a true presence in cyberspace. To date, hip hop online has been wack, boring, and mediocre. Outside of the hip hop room we created on AOL, there's no central place for headz to get down. It is ironic how you can find thousands of rooms for Teen Chat or Romance Connection on any online service, but a hip hop area is virtually nonexistent. This is reminiscent of the "ghettoization" of hip hop, when we could only hear rap music three hours a week on Saturday nights or catch rap videos during Yo! MTV Raps. Is there a lack of demand for hip hop? We think not.*

The online version of *4Control* was launched at the same time. With more real estate and less overhead costs than print, the webzine grew quickly. It published the wisdom of hip hop's now forgotten forefathers. Online MC battles reminiscent of the '70s glory days lit up the server. Slowly 198 ▶

Chip Hop

◀ 197 Steve and Felicia added layers of new content, chat spaces, and the latest RealAudio streams the same way Grandmaster Flash and Cowboy built layers of beats and rhymes.

Early this year, Felicia made the decision to morph *4Control* into Support Online Hip Hop. With its hip hop search engine linking independent sites and a section with new-media tips and techniques, the venture really took off. "Support Online Hip Hop has developed a strong community," Felicia says in perfect marketingspeak. "And it will become a business. We have the highest daily traffic volume of any independent hip hop Web site, and we have a very desirable demographic. We are merging the community and business aspects of the site, so that independent artists and webmasters ultimately will be able to conduct business through its distribution channels."

THE SHOWMAN

Before Felicia recruited Randy Nkonoki-Ward to become a founding member of Support Online Hip Hop, he was the host of a novel but rather strange media venture. In January 1996, with some help from Nynex, Randy pumped out the first nationwide hip hop "radio" program.

From his bedroom, Randy and his collaborators would cut records, drop beats, and break dance. With the underground sounds of J-Live, The Arsonist, and Mr. Complex, the scene seemed like a homey reincarnation of Flash's block party. Listeners would dial 1-900-88-HIP-HOP, and on the other side of the phone Randy "broadcast" his national radio program. A kind of hack into the radio world, it wasn't the most successful business model. "My radio show cost 99 cents a minute, and not everybody has that kind of money to spend," says Randy.

While putting together his 900-number show, Randy would leave mix tapes from the previous concerts around town – one at a local café, another at a record store, others at parks or wherever. That's how someone from The Pseudo Online Network, a New-York based netcasting superstation, stumbled across Randy's sound.

These days Randy takes www.88hiphop.com worldwide every Wednesday night at 10 p.m. EST. The hundred or so rap aficionados who show up at Pseudo in the flesh come

to jack in to online hip hop. It's a hangout where new-media headz devote equal time to bitching about commercial radio, vowing to do something about it, and soaking in alternative. All the while, multiple streams of RealAudio and CU-SeeMe push underground hip hop into the Net's consciousness.

At normal radio stations, DJs pick songs that appeal to the target audience: 18- to 25-year-old Latinas, 25- to 40-year-old black men, white suburban teenagers with disposable income, whatever. This commercial reality leads musicians into the old music industry runaround: the radio station would love to play your song if only it sounded like the hot artist that the major label was pushing, while the label would love to sign you if only your music resembled what was playing on the radio. For artists like The Derelect Camp, the Net offers a new venue for reaching an audience outside the homogenized music-industry machine.

For the time being at least, *88 Hip Hop* and other fledgling Net radio outfits still have the Web more or less to themselves. Bandwidth

At Chocolate City, intelligent brothers could hang out and not be labeled as brainiacs.

supports little more than radio-quality audio, and few online ventures are turning a profit yet. That means that the big boys of the music industry haven't arrived. And, according to a recent Jupiter Communications report, the bit players have an additional edge – online sales of niche music genres have flourished, while sales of mainstream music have languished. In other words, the little guys can do what the Web was supposed to do all along: turn passionate people into publishers. They can experiment and target their music to extremely narrow audience niches – ones that can aggregate quickly when gathered from around the world.

Randy hosts proven acts like Afrikkaa Bambaataa, De La Soul, and the Jungle Brothers and lesser-knowns such as Brother J, Heltah Skeltah, and the Crash Crew. The high point of his efforts was a show he put on in February that featured GhostFace Killah from the Wu-Tang Clan. More than 7,000 people checked out that event. That may not seem like huge numbers, but he thinks it's just the beginning.

THE DIGERATO

Pascal Antoine, the final founder of Support Online Hip Hop, is an independent Web publisher who looks the part of the professional. He speaks in complete, grammatically correct sentences at all times. And, while he holds a corporate day job as an Internet analyst for ChaseMellon Shareholder Services, Pascal really likes to form complete sentences about Fresh Finesse, his Web-based bulletin board.

In the late '80s, Pascal attended MIT, where the caffeinated geekiness often breeds alienation. Pascal and 26 other African American students survived by banding together in a cooperative living arrangement they called Chocolate City. "It was a place to chill out after class, get some work done, and hang out with some very intelligent brothers without being labeled a nerd or brainiac," recalls Pascal.

Back then, the MIT Media Lab was relatively new and way ahead of its time. But Pascal saw the promise and migrated toward new media, joining a seven-person

team building a virtual tour of Boston. He was responsible for programming individual sequences so that when users turned a corner, the proper digital film sequence would cue. He also did a lot of the grunt work. Pascal inked butcher shop windows and Keep Off the Grass warnings for a town that existed only in virtual space. He recreated city grids and skyscrapers, subways and soda shops. Painting street signs for an entire city that's totally devoid of human beings gets you thinking.

One of the things he thought a lot about was how people would use these new spaces, how inhabitants would navigate virtual worlds. "Virtual Boston was exact down to the letters on the shop windows, but there was no one there," says Pascal. "It made me realize that when the Web incorporates more visual and tactile interfaces, the next great herd will colonize its wide-open spaces."

Nowhere is the need for new interfaces more critical than in the hip hop community. Music is heard. And hip hop is more of 207 ▶



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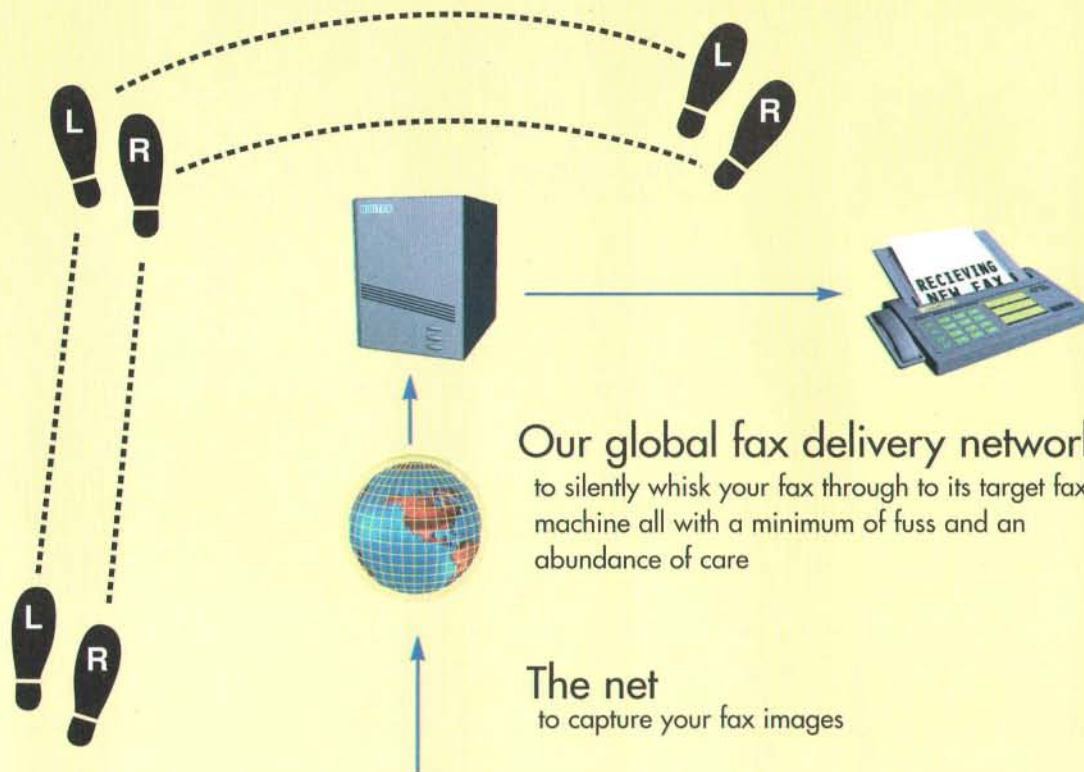
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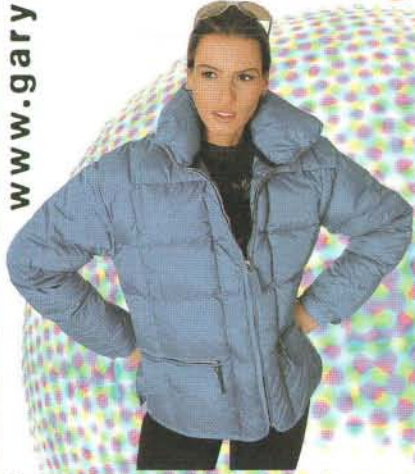
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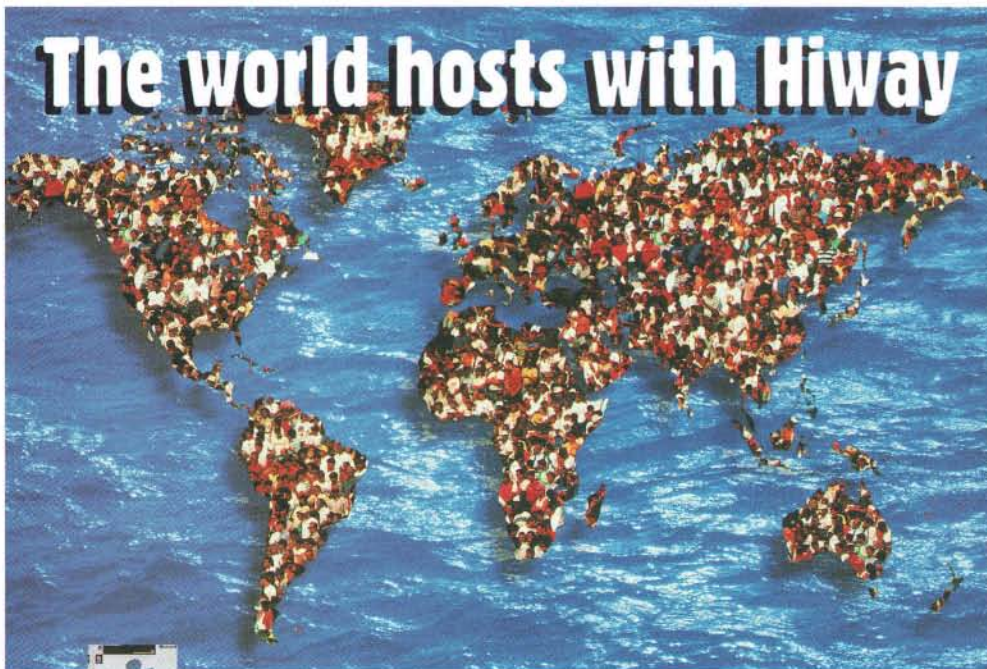
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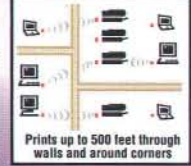


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Chip Hop

◀ 198 an oral culture than most musical forms – raps are often winding and self-referential narratives built around a distinct vocabulary and set of experiences. Keyboards limit both access to the Net and artistic expression within Net-based hip hop. Moving interfaces away from text toward more immediate oral and visual ways of communicating, Pascal says, will bring new communities online.

Today, Pascal is busy figuring out what his people want from an online community. He describes his current project, *Fresh Finesse* (www.freshcom.com/), as “where cyberspace meets the ‘hood.” It’s a virtual city where Brazilian hip hoppers trade mother jokes with kids from neighborhoods in the United States. Pascal doesn’t censor postings, and the community has grown organically and developed a life of its own.

Pascal thinks the success of *Fresh Finesse* is a sign that the herd will come, but the imminent arrival of large numbers of new people

about making money. This gathering is making a new introduction: Hip hop, meet Silicon Valley – Silicon Valley, meet hip hop.

Steve and Felicia are witnessing the power of Silicon Valley firsthand. Dozens of PCs are located throughout the restaurant. Steve stands in front of a VRML demo depicting a virtual turntable. The audio sucks, but the point isn’t lost on Steve. Intel and CNET clearly have resources way beyond Steve’s reach.

Intel, unsurprisingly, hopes Mediadome will spark interest in multimedia and help sell a few more microchips. CNET sees it as a way to build its brand. For Support Online Hip Hop, the arrival of these new kids on the hip hop block creates both opportunities and risks. Because these high tech firms are moving toward the same space as Support Online Hip Hop, the two groups are both potential allies and competitors.

People like Felicia and Steve occupy one end of the online hip hop spectrum. Mediadome, a true multimedia colossus, sits on the other end. The creatives know the music,

Hip hop, meet Silicon Valley – Silicon Valley, meet hip hop.

also raises troubling questions – especially for those who know hip hop history. As online hip hop becomes more popular, the success will attract the soulless commercial interests. Pascal and the other Support Online Hip Hop members are all for making money off the inevitable convergence of new media and hip hop. But what happens when big business crashes the party?

THE PARTY

At a trendy downtown restaurant in Manhattan, impatient reporters stand in line while Intel and CNET employees check press credentials. Inside, older guys in suits order Tanqueray martinis. Waiters in ties serve ribs – sans bones – on bite-sized puffed cornbreads. It all seems a bit out of scale when compared with *88 Hip Hop*, but Intel and CNET’s joint online music venture, Mediadome, brings out the stars. Everyone’s there to see the Fugees, the 1996 commercial success story of hip hop, and to talk serious business. The Mediadome isn’t about giving voice to underrepresented artists – it’s

and the corporations know the silicon. The music industry has yet to arrive en masse, but that, too, will pass. “A lot will change in the coming years,” says Harry Allen. “Bandwidth will increase, and ecommerce will become viable. Computers will become more intuitive, but also more kinesthetic. The holy grail of the collision between hip hop and digital media is the oft-promised notion that every artist will become his or her own music label.”

If you listen long enough to the folks heralding that collision, you begin to hear them singing the psalm of new media: In the information age, you control the means of production – your mind. If you’re lucky, you own the product – your ideas. But it’s at the distribution level that the ultimate battle for commercial supremacy of new media will be fought. That psalm portends a coming judgment day, when all the forces are aligned. And the lyrics to that psalm might very well end up being the words to the title track from the Troubleneck Brothers’ first album: *Fuck All Y’all*. ■ ■ ■

Message: 51
 Date: 9.1.97
 From: <nicholas@media.mit.edu>
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 Subject:

The new story of disintermediation is an old bits-and-atoms classic. The complex process of "things" has created a food chain of middlemen and wholesalers who import, export, warehouse, and redistribute physical items. For this reason, when you buy tomatoes for US\$1.57 per pound, the grower gets less than 35 cents, while the rest goes to all the people in the middle (in the case of tomatoes, up to seven intermediaries may be involved). If you could buy direct, it would be a no-brainer to split the difference with the farmer, which would no doubt please the both of you.

In fact, this is how online retailing started. Boutique winemakers north of San Francisco could not attract the attention of large wholesalers, nor were they satisfied with limited local distribution. Enter the cork dork.

To avoid extinction, middlemen must add a new dimension of value – personalization.

Brothers-in-law Robert Olson and Peter Granoff, who refer to themselves as "propellerhead" and "cork dork," created Virtual Vineyards (www.virtualvin.com/), one of the first Web sites to retail anything, let alone wine. In theory, they run a no-inventory business by arranging to drop-ship wine directly to your home, while collecting a nominal fee for arranging the sale and handling the billing.

But, wait a second. Why do I even need them? Why couldn't each vineyard run its own Web page and just agree on simple terms (full body, tannic, fruity, et cetera) and conditions (blend of grapes, use of oak, price per bottle, et cetera), so that a computer program could do the work of Virtual Vineyards, thereby cutting it out as well?

Well, winegrowers could. And someday they will, albeit none too soon.

Death of a car salesman

The experience of buying an automobile is so unpleasant that experts uniformly agree that car salespeople should be "disintermediated." This is substantiated by the fact that automobile-related Web transactions are expected to reach close to \$1

billion this year. Car dealerships are not like supermarkets; you've already made most of your buying decisions when you enter the showroom. It is in effect a factory outlet. For this reason, it's not hard to imagine buying directly from the factory. Automobile manufacturers would embrace this strategy aggressively, if it did not risk annoying the prime retail channel in the short term.

Car salespeople are comforted by this reality, but they also know their days are numbered – especially the young dealers, who won't be dead before it happens. They may be rude, but they're not dumb. They need to adopt a better attitude, become more pleasant, and focus on aftersales. The latter can be as silly as a birthday card or as serious as a warrantied house call. Therein lies the secret: as you are about to be dis-



intermediated, reintermediate yourself by adding a new dimension of value. Typically, this is a service with some flavor of added personalization.

What bits have to learn from atoms

Unlike tomatoes or cars, real estate listings, stock quotations, and airline schedules are bits, easily and inexpensively shipped at the speed of light. Bits need no warehousing, and the cost to make more is effectively zero. For this reason, real estate agents, stockbrokers, and travel agents will disappear much more rapidly than food wholesalers or car dealers. In the case of travel planning, a great deal of hocus-pocus has been introduced – the purpose is to make it almost impossible for you or me to understand the jargon of airline reservations or the price changes, which are posted five times a day!

As computer programs are developed to help normal people make their own reservations, the travel agents will need to learn something from the car salespeople. I may be nostalgic, but I recall that old-fashioned travel agents knew something about travel – many of them had actually traveled and

had tried hotels. More important, they got to know their clients and could personalize their recommendations. "Nicholas, since you like the Okura in Tokyo and the Peninsula in Hong Kong, you'll love Raffles in Singapore." And I do.

Eventually, computers will do that, too. But individualized service is certainly one way to keep a step ahead of being disintermediated; that is, to reintermediate.

Reintermediated publishing

The people who really ought to be disintermediated are publishers. Here I draw a distinction between magazines (of course) and books: the former sells context, and the latter sells content. The content side of the equation can and will go direct the fastest.

Since books are physical things distributed largely through thousands of retail outlets that buy one or two copies at a time, you and I would have trouble distributing as well as Knopf. Otherwise, we really can do without them.

But tilt. People will say, "I bought your book because Knopf published it." Knopf was the talent scout, the finishing school, the company whose judgment is trusted. Well, rubbish to that. Think of the last three books you've read. Do you remember the publisher? You know the author and the title, as well as the book's color, shape, and thickness. But you're unlikely to recall which company published it.

Whether you read Grisham or Goethe, you read the author, not the publisher. That's why traditional book publishers will slowly but inevitably disappear. Bookstores will vanish even sooner, as they bring almost no value over a Web site like Amazon.com. So who will remain?

The answer is a new intermediary. One who – or that – tells you which books you are most likely to enjoy. Think of it this way. How many hours have you wasted on a book that was just not worth your time? I feel about reading a book the same way I feel about waiting for a bus. Having already invested time doing so, I feel I might as well amortize that time by spending a bit more, and a bit more, until the bus comes – no matter how late. The digital intermediaries may change that forever. I want them to. So do you. ■ ■ ■

Next Issue: On Digital Growth and Form

THE SUN'S RAYS TRAVEL OVER
92,000,000 MILES TO REACH EARTH.
MAKE IT WORTH THEIR WHILE.



The 1997 Celica

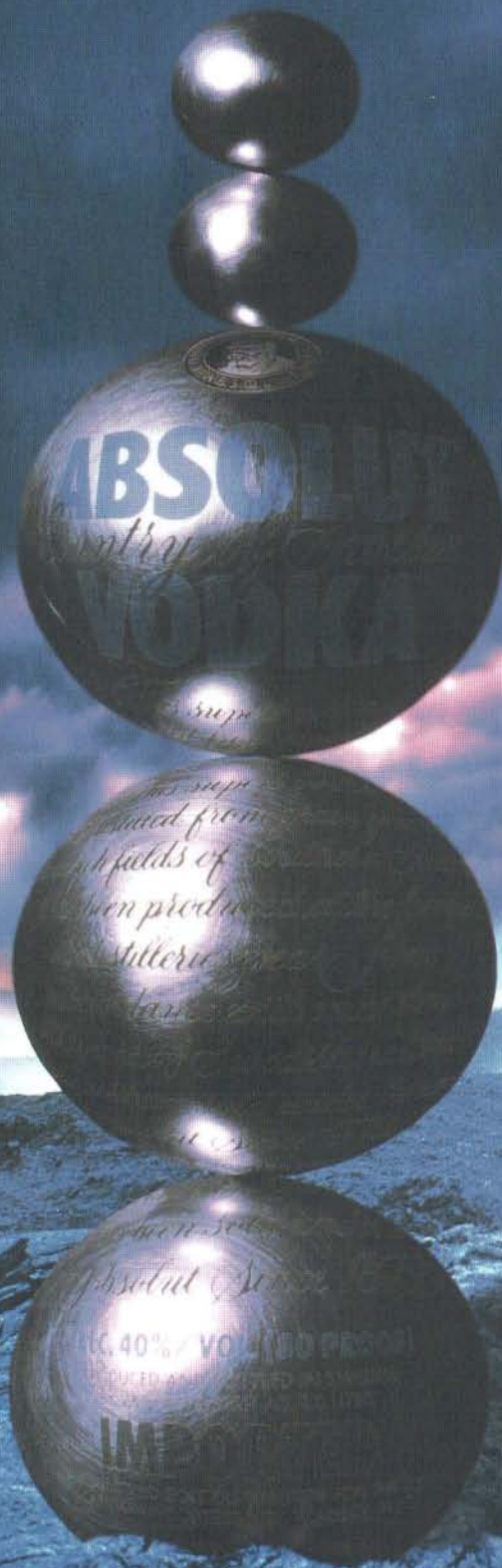


The 1997 Paseo

Catch some rays in the all-new Toyota Paseo Convertible. Sleek lines. Rear spoiler. And glass rear window with defogger. Hot stuff starting from around \$17,200.* Not to be outshined is Celica. Graceful and sophisticated, this sunseeker has everything Paseo offers. And then some. Of course, nothing can eclipse their built-in Toyota quality. So put the top down, turn the tunes up and show those rays a good time. After all, they deserve it.



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